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OF COMMERCE

HENRY A. WALLACE, *Secretary*

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BIBLIOGRAPHY
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LIST OF ABBREVIATIONS

Below are listed abbreviations used in bibliography for the names of governmental agencies and other organizations issuing reports.

AAF	ARMY AIR FORCES.	NAVAER	NAVY DEPARTMENT BUREAU OF AERONAUTICS.
AFETO	ARMY FORCES IN THE EUROPEAN THEATER OF OPERATIONS.	NAVDOCKS	NAVY DEPARTMENT BUREAU OF YARDS AND DOCKS.
AFMPAC	ARMY FORCES IN THE MIDDLE PACIFIC.	NAVORD	NAVY DEPARTMENT BUREAU OF ORDNANCE.
AFMTO	ARMY FORCES IN THE MEDITERRANEAN THEATER OF OPERATIONS.	NAVSHIPS	NAVY DEPARTMENT BUREAU OF SHIPS.
AFPAC	ARMY FORCES IN THE PACIFIC.	OPRD	OFFICE OF PRODUCTION RESEARCH AND DEVELOPMENT.
AMC	AIR MATERIEL COMMAND.	OSRD	OFFICE OF SCIENTIFIC RESEARCH AND DEVELOPMENT.
ATI	AIR TECHNICAL INTELLIGENCE.	QMB	QUARTERMASTER BOARD.
ATIC	ARMY TECHNICAL INTELLIGENCE CENTER.	QM	QUARTERMASTER CORPS.
ATSC	AIR TECHNICAL SERVICE COMMAND.	SHAEF	SUPREME HEADQUARTERS ALLIED EXPEDITIONARY FORCES.
BIOS	BRITISH INTELLIGENCE OBJECTIVES SUB-COMMITTEE.	SIG CORPS	SIGNAL CORPS.
CIOS	COMBINED INTELLIGENCE OBJECTIVES SUB-COMMITTEE.	TIIC	TECHNICAL INDUSTRIAL INTELLIGENCE COMMITTEE.
CWS	CHEMICAL WARFARE SERVICE.	WPB	WAR PRODUCTION BOARD.
EEIS	ENEMY EQUIPMENT INTELLIGENCE SERVICE.		
FIAT	FIELD INFORMATION AGENCY, TECHNICAL.		
JDL	JAHRBUCH DER DEUTSCHEN LUFTFAHRTFORSCHUNG.		
JIOA	JOINT INTELLIGENCE OBJECTIVES AGENCY.		
NDRC	NATIONAL DEFENSE RESEARCH COMMITTEE.		

CHEMICALS AND ALLIED PRODUCTS

Dyes

PB 22409. HOLMES, P. C. German dyestuffs and intermediates: sodium hydrosulphite, sodium sulphoxylate: Industries. (BIOS Final Rept 271, Item 22) Feb 1946. 22 p. Price:Microfilm-50¢ - Photostat-$2.00
Report describes the production at I. G. Höchst, Frankfurt am Main of the following: pyranil, nitropyrene, amino pyrene, chloranil and Sirius Light Blue. There is a description of the azo-dye plant including vats, presses, ice plant and dryers. Information was also received about the constitution of the metachrome dyes. Report also describes the production at the I. G. Farben plant at Leverkusen of zinc hydrosulphite, sodium hydrosulphite and sulphoxylates (Rongalit). Flowsheets of the zinc hydrosulphite process are attached.

Agricultural Chemicals

PB 20634. QUICK, C. D. Investigation of aero cyanide in generating fumigants and the generation of fumigants at low temperatures. (Edgewood Arsenal Chemical Div Rept 261) May 1923 16 p. Price: Microfilm - 50¢ - Photostat - $2.00
Aero cyanide is crude calcium cyanide containing approximately 45% $Ca(CN)_2$. Calcium oxide is present, and is the cause of a relatively high reaction temperature. There occurs an increase of volume of the reaction mixture (largely foam) when "aero" cyanide is acted upon by hydrochloric acid. The amount is dependent upon the dilution (by water) of the acid used, and also upon temperature. Lachrymation, the warning phenomenon, is produced in effective quantity. The lethal power of the mixture of gases generated when "aero" cyanide is used, is effective to destroy adult rats in between 75 and 360 seconds, dependent upon the location of the animal relative to the source of the lethal agent.

PB 19258. U. S. CHEMICAL WARFARE SERVICE. Insect and rodent control: CWS monthly progress reports 1-6, Mar - Aug 1945. Mar-Aug 1945. 356 p. Price: Microfilm-$4.00 Photostat-$24.00
Objectives of the program reported were: (1) The synthesis of compounds analogous to DDT, (2) the use of chemical warfare agents and their intermediates in the preparation of test compounds, and (3) the synthesis of new compounds in a systematic attempt to eliminate deficiencies in existing insecticides, miticides, and rodenticides. Results reported include: Examination of a large series of compounds, including xylyl benzoate isomers and mixtures, 2-phenyl cyclohexanol and sulfones; miscellaneous experiments on DDT toxicity, including acute neurological and neurophysiological symptoms; Peet-Grady determinations and residual tests of CD compounds against houseflies; control of fly breeding and odor in decaying organic material; stomach poison evaluation against Mexican bean beetles and larvae of the southern army worm; contact tests against milkweed bugs and black bean aphids; means for the evaluation of the dispersal of insecticides and rodenticides with curves of drop distribution, particle size and density of contamination from DDT spray; toxicity of candles containing hexamine or ammonium carbamate and of various types of smokes; insect-proofing formulations; mite-proofing of clothing by impregnation with dimethyl phthalate. Graphs, diagrams, tables and bibliography are included.

Plastics and Plasticizers

PB 19858. COPELAND, M. A. and YOUKER, M. A. Manufacturing process for Desmodur R. (FIAT Final Rept 712) Jan 1946. 8 p. Price: Microfilm-50¢ - Photostat-$1.00
I. G. Farben makes four types of isocyanates under the name of Desmodur. Type R, the newest product is the tri-isocyanate from triamino triphenyl methane. A brief summary of the procedure follows: $HC(C_6H_4.NH_2)_3$ is reacted with 3 mols $COCl_2$ to give $HC(C_6H_4.NCO)_3$ plus 6 mols HCl. The reaction is carried out in chlorobenzene in 3 stages - first at 5°C (3-4 hours) then at 5° to 50°C (5-6 hours) and finally at 105-110°C (12 hours). The insoluble by-product is removed by filtration, the chlorobenzene removed by distillation and a 20% solution of the triisocyanate prepared in methylene chloride and sold as Desmodur R. A yield of 86% is obtained. A flow sheet illustrates this process and another flow sheet shows the apparatus for the recovery of phosgene. Lead-lined agitator and reactor kettles are used, but they felt that stainless steel could be used. Care must be taken not to use metals which would bring about polymerization. The operation of the reactors, filtering system, still for recovering chlorobenzene standardization kettle, phosgene recovery and hydrochloric acid absorption are described. Desmodur R is used for special adhesives and for bonding rubber to metal and rubber to tire cord. This report is typewritten and may not photograph well.

PB 16336. I. G. FARBENINDUSTRIE. Verfahren zur polymerisation von diolefinen (Method for the polymerisation of diolefines). (Enlargement print of part of microfilm 183-6) Dec 1929. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
Alkali metals, their mixtures or alloys are used as polymerizing agents by finely dispersing them in rubber, rubberlike substances (such as gutta-percha, balata, etc.) or polymers of butadiene hydrocarbons). This document was the basis for patent application I40108IVa/39b1 applied for Dec 11, 1929, but later withdrawn, as it was covered by German patent 536075. In German.

Paints, Varnishes and Lacquers

PB 20613. WALLIS, C. H. Para-coumarone resins as a protective lining for brombenzylcyanide shells. (Edgewood Arsenal Chemical Div Rept 51) Jun 1921. 7 p. Price: Microfilm-50¢ - Photostat-$1.00
The para-coumarone-china wood oil lacquer was found to be nonresistant to brombenzylcyanide and it was concluded that the lacquer has no value as a protective lining in these shells. The experiments are given which resulted in this conclusion.

PB 20690. WERKHOFF, B. L. Moravian Green anti-fouling paint. (Edgewood Arsenal Chemical Div Rept 237). Dec 1922. 14 p. Price: Microfilm-50¢ - Photostat-$1.00
This report describes: (1) the analysis of Moravian Green anti-fouling paint used to check the growth of sea-water organisms on ship bottoms; (2) the duplication of a sample of paint having the same physical characteristics as the original paint (the composition is given); and (3) a method of analysis for paints of the metallic soap type.

Inorganic Chemicals

PB 20686. KNAPP, T. H. Hydrolysis of sodium ferrite. (Edgewood Arsenal Chemical Div Rept 228). Sep 1922. 18 p. Price: Microfilm-50¢ - Photostat-$2.00
This investigation was conducted in connection with the manufacture of nitrogen peroxide by the action of sodium nitrate on ferric oxide. In this process a mixture of sodium ferrite and ferric oxide is discharged from the reactor, the sodium ferrite content being normally about 35 to 45%. When sodium ferrite is treated with water, it yields sodium hydroxide and ferric oxide. Experimental data, tables and graphs are given.

PB 20697. KNAPP, T. H. and SHAFFER, H. G. Development of a manufacturing process for nitrogen peroxide. (Edgewood Arsenal Chemical Div Rept 147) Apr 1922. 61 p. Price: Microfilm - $1.00 - Photostat - $5.00
This report covers the theoretical and experimental laboratory and plant development data on the production of nitro-

gen peroxide from sodium nitrate using iron oxide as a catalyst and cold silica gel as an absorbent from which the nitrogen peroxide is distilled, condensed, and collected. Conclusions, estimated costs, bibliographs, and diagrams are attached.

PB 22579. LEHMANN, A. S. The production of potassium from sodium and potassium carbonate on a pilot plant scale: Fourteenth partial report on oxygen source material. (Naval Research Lab Rept P-2106) Jul 1943. 49 p. Price: Microfilm - 50¢ - Photostat - $4.00
The production of potassium from the reaction of sodium with solid potassium carbonate at reduced pressure is chemically and mechanically sound. A pilot plant was erected at the Naval Research Laboratory which demonstrated this fact. The process employed is a combination of reaction and fractionation carried out in an oxygen-free, closed system at a pressure near 50 mm. of mercury. From this pilot plant unit, potassium (ave. 95 wt %) can be produced at a rate of 31 lbs. per 5½ hour cycle per column. Pure potassium can be produced at a slightly slower rate. The cost of potassium produced on a commercial scale by this process should not exceed $1.00 per pound. The report consists of: Theoretical considerations, raw materials, construction of plant, description of equipment, plant operation, experimental difficulties, factors influencing the reaction, production results, costs, and conclusions. Photographs, tables, diagrams, and graphs are appended.

PB 18309-18312. U. S. CHEMICAL WARFARE SERVICE. FRED project. (Res Branch Rept 1-3; Report of the Engineering Branch). 1945. Prices are as listed below.

PB	Report	Date	Pages	Price Microfilm	Price Photostat
18311	1	Jul 1945	142	$1.50	$10.00
18309	2	Jul 1945	33	.50	3.00
18310	3	Jul 1945	117	1.50	8.00
18312	Eng	Sep 1945	264	3.00	17.00

The following chemical propellants have been studied: Hydrogen peroxide-permanganate (PB 18311); red fuming nitric acid (RFNA)-aniline (PB 18309); nitromethane-oxygen (PB 18310). Corrosion and stability studies embody considerations of: Handling and sampling of the chemicals used as propellants, their stability in glass and in metal containers, heat stability, sensitivity to impact by shock and by gunfire, purification, stabilizers, and any corrosion effects. Reaction studies include measurements of velocity of pressure development in a closed high pressure bomb and in open reaction chambers of the thrust motor type. Analytical studies cover the determination of the concentrations of peroxide and permanganates, after contact with various materials under varying conditions of temperature and storage; the determination of trace impurities; and various physical properties such as density, viscosity and freezing point. Data indicated that the nitric acid-aniline system and the nitromethane system could be made suitable for launching the JB-2 bomb only after an extensive development program. Therefore, only the hydrogen peroxide-calcium permanganate system was tested in the small scale and large scale propelling units. In a report of the Engineering Branch (PB 18312) two methods for launching are described. One method depends upon the decomposition of hydrogen peroxide by calcium permanganate solution in a reaction chamber attached to a tube launcher. The second method utilizes compressed air for propelling it from the tube launcher. Four control units which were fabricated and tested are described. These units introduced the hydrogen peroxide and calcium permanganate into the reaction chamber at the correct accelerated rates. The two air propelling units which were fabricated and tested are also described. Results from both small scale and full scale tests are included. The hydraulic control unit, which was fabricated and tested as a small scale unit, controlled the accelerated feed of chemicals in a manner more accurate than the other units. The tentative design is included for a proposed full scale hydraulic control unit, based upon tests with the small scale unit. Tables, graphs, diagrams, photographs and film records of measurements are given.

PB 22079. U. S. WAR DEPARTMENT. Generators ML-185-A and ML-185-B: Hydrogen. (Tech Manual 11-2400) May 1945. 61 p. Price: Microfilm - $1.00 - Photostat - $5.00
The above named hydrogen generators are complete portable equipments for generating hydrogen for the inflation of meteorological balloons. The hydrogen is produced in a steel generating cylinder and results from the reaction of sodium hydroxide (caustic soda), water, and either ferrosilicon or aluminum depending upon the process used. This manual describes the equipment and provides instructions for its operation, maintenance, and repair. Photographs, drawings, and diagrams are included.

PB 22211. U. S. WAR DEPARTMENT. Hydrogen generator ML-303/TM and hydrogen generator set AN/TMQ-3. (Tech Manual 11-2413) Apr 1945. 34 p. Price: Microfilm - 50¢ - Photostat - $3.00
These generators are used to generate gas for the inflation of meteorological balloons, using calcium hydride charges. The generator is immersed in water and the reaction of the calcium hydride and the water releases hydrogen gas. The generator set uses 4 units assembled in a manifold for inflating larger size balloons. Operating, maintenance, and repair instructions are given. Photographs, charts and tables are included.

Ordnance Chemicals

German

PB 20884. REEVES, A. M. German yellow cross gas field identification training set. (CWS Foreign Material Tech Rept M9) Feb 1945. 2 p. Price: Microfilm-50¢ - Photostat-$1.00
The purpose of this report is to give a more thorough analysis of German mustard gas. A complete analysis is given.

United States

PB 20725. ALBERT, T. J. and REED, ALLEN B. Preparation of cyanchlorformate. (Edgewood Arsenal Chemical Div Rept 184) Jun 1922. 3 p. Price: Microfilm - 50¢ - Photostat - $1.00
The preparation of cyanochlorformate was attempted as it was thought this compound might combine lethal and lachrymatory properties. Cyanochlorformate was not obtained by the action of phosgene on sodium cyanide in either aqueous or benzene solution. The reaction yielded products of decomposition and hydrolysis. Ref (Ann. 287, 309 (1895)) as it was later found, obtained the same results in an attempt to prepare carbonyl cyanide. The history and experimental data are given in the report.

PB 20726. BLAYLOCK, F. R. Destruction of mustard. (Edgewood Arsenal Chemical Div Rept 187) Jun 1922. 12 p. Price: Microfilm - 50¢ - Photostat - $1.00
A number of chemical reagents have been tested to determine their efficiency in destroying mustard gas in the field. For these tests, mustard was sprayed on earth packed in small boxes, the destructive agent was then applied to the mustardized earth, and rats and mice were exposed at different intervals after the application. Bleaching powder gave the highest efficiency as a destructive agent of mustard gas. Data on laboratory tests and small scale field tests are given in the report. A bibliography is attached

PB 20723. BLAYLOCK, F. R. Preparation of aluminum chloride and use of aluminum chloride-benzene complex as a catalyst in the preparation of chloracetophenone. (Edgewood Arsenal Chemical Div Rept 181) Jun 1922. 7 p. Price: Microfilm - 50¢ - Photostat - $1.00

is an attempt to develop an efficient method for the preparation of aluminum chloride at a low temperature, two general methods were investigated. The first consisted in the action of chlorine on aluminum amalgam. However, it was found to require as great a temperature as for the pure metal besides contaminating the product with mercuric chloride. The second method consisted in the preparation of the aluminum chloride-benzene complex. However, the results indicate that the preparation of aluminum chloride by this method is not feasible since the chloride could not be recovered by ordinary means. Since it is believed that aluminum chloride and benzene form a complex as an intermediate product in the preparation of chloracetophenone from chloracetyl chloride and benzene by the Friedel-Crafts reaction, the complex obtained was tried as a catalyst for this reaction. Yields of only 38% of theory were obtained as compared with yields of 90% when pure aluminum chloride is used. The experimental data and conclusions are given in the report.

PB 20703. BLODGETT, W. A. Preparation of diphenylphenoxyarsine. (Edgewood Arsenal Chemical Div Rept 156) May 1922. 6 p. Price: Microfilm - 50¢ - Photostat - $1.00

Diphenylphenoxyarsine was prepared according to the method of Michaelis as follows: Sodium phenolate in boiling xylene solution was treated with diphenylchlorarsine. The resulting solution of diphenylphenoxyarsine was filtered from the sodium chloride formed and the xylene was distilled off in an atmosphere of carbon dioxide. The resulting product was an oil which would not crystallize even in an ice mixture. It analysed 23.1% arsenic, the theoretical being 23.3%. It was shown by this work that the product which was obtained and which thereto was considered to be diphenylphenoxyarsine was in reality diphenylarsenious oxide. Toxicity tests showed the entrance point for diphenylphenoxyarsine to be 0.0003 mg/l. It is initially about half as effective as DM (diphenylaminechlorarsine), but subsequent symptoms are much less severe. The entrance point for diphenylarsenious oxide is 0.0004 mg/l. Since diphenylphenoxyarsine is readily hydrolyzed to diphenylarsenious oxide, it may be true that this hydrolysis takes place on volatilization of the material for toxicity tests and that the irritation produced is due to the diphenylarsenious oxide.

PB 18867. BLOMQUIST, ALFRED T. Certain aliphatic nitramines and related compounds. (OSRD Rept 4134) Nov 1944. 166 p. Price: Microfilm - $2.00 - Photostat - $12.00

This report presents the results of investigations dealing with the preparation and properties of some aliphatic nitramines. Several compounds related to ethylenedinitramine (Haleite) were prepared. N-methyl-ethylenedinitramine, N,N'-dimethyl-ethylenedinitramine and dinitropiperazine were obtained by alkylating ethylenedinitramine. When N-methyl-ethylenedinitramine was reacted with ethylene dibromide two isomeric compounds, N^1, N^4-dimethyltriethylenetetranitramine and iso-N^1,N^4-dimethyltriethylenetetranitramine were isolated. The latter substance was shown to have a single isonitramine linkage. The effect of cold absolute nitric acid on nitramines was studied. In general, primary nitramines are converted into the corresponding nitrates, secondary nitramines are unaffected, and isonitramines are cleaved at the isonitramine linkage to give nitrates. Halogenation of ethylenedinitramine and its monomethyl derivative with iodine was unsuccessful. However, these compounds could be successfully brominated to give N-bromo derivatives. Propylenedinitramine was prepared using the procedure of Franchimont which involved nitration of the urethane followed by ammonolysis of the nitrourethane. Nitramine derivatives of neopentane, including pentaerythrityl tetranitramine and pentaglyceryl trinitramine, were synthesized from pentaerythritol and pentaglycerine. Pentaglycol dinitramine was not prepared because of the difficulty of obtaining the corresponding diamine. The nitramine analog of nitroglycerine, 1,2,3-trinitraminopropane, was synthesized in small yields following a procedure outlined by Bachmann. The synthesis of tris (nitraminomethyl) amine was attempted but not accomplished. Several methods were employed but in no case could the desired product be obtained. Nitroxyalkyl nitramines were prepared from a variety alkylol amines, some of which are commercially available, through the application of the catalyzed Bamberger reaction. This reaction, discovered by Dr. George F. Wright at Toronto, may be represented as the conversion of secondary amine nitrates into nitramines by means of acetic anhydride in the presence of a chloride ion catalyst.

$$R_1R_2NH_2\,NO_3 \xrightarrow[0°C]{Ac_2O} R_1R_2N\text{-}NO_2 + H_2O$$

N-(β-nitroxyethyl) methylnitramine, N-(β-nitroxyethyl) ethylnitramine, N-(β-nitroxypropyl) methylnitramine, N,N'-bis(β-nitroxyethyl) ethylenedinitramine, and N,N-bis(β-nitroxypropyl) nitramine were obtained from the corresponding amino-alcohol. Other nitroxyalkyl nitramines were prepared by the Franchimont technique. These include N-(β-nitroxyethyl) nitramine, N-(β-nitroxypropyl) nitramine, and dinitraminoisopropyl nitrate. From trimethylol aminomethane two nitrated compounds were obtained, 4,4-bis-(nitroxymethyl) oxazolidone and 3-nitro-4, 4-bis(nitroxymethyl) oxazolidone. The synthesis of pentaglycerine from propionaldehyde and formaldehyde was studied in light of its application to the preparation of pentaglyceryl trinitramine, and pentaglyceryl trinitrate. As side products there were isolated acetals whose structures were ascertained. Also, presented in this report is a detailed account of experiments conducted on the ammonolysis of pentaerythrityl bromide. The explosive properties of several alkyl nitramines and nitroxyalkyl nitramines are presented. The index gives a formula index of nitramine derivatives with their coded equivalents. This is a progress report under contract with Cornell University.

PB 19787. BLOMQUIST, ALFRED T. and RYAN, JAMES F. JR. Report on studies related to the stability of PETN, to Feb 29, 1944. (OSRD Rept 3868) May 1944. 44 p. Price: Microfilm-50¢ - Photostat-$3.00

Pentaerythritol tetranitrate (PETN) was combined with TNT to form pentolites. The pentolites were somewhat unstable and tests were conducted upon PETN to check its stability. Tests showed that PETN, when crystallized from solution, contained occlusions of the mother liquor. It proved too difficult or impossible to remove the liquor. Small amounts of di-pentaerythritol hexanitrate (DiPEHN) could inhibit the occlusion of some of the liquor. However, on testing the vacuum stability of the pentolites and the vacuum stability of the PETN, it was seen that there was no relation between the two. The decomposition of PETN in solution in TNT depended only upon the concentration of PETN. Report includes studies of the crystal structures of PETN and DiPEHN and a phase study of the PETN-DiPEHN systems. Tables, photomicrographs, diagrams and bibliography are included. This is a progress report under contract with Cornell University.

PB 20680. EHRENFELD, DAY. The use of 75mm. smokeless powder as the fuel in the C.N. candles. (Edgewood Arsenal Chemical Div Rept 219). Oct 1922. 4 p. Price: Microfilm-50¢ - Photostat-$1.00

These experiments were to determine the advisability of using 75 mm. smokeless powder as the fuel in the C.N. (Chloroacetophenone) candle instead of the .30 calibre smokeless powder now used, some 20 candles being made up and fired in which the percentages of 75 mm. smokeless powder varied from 65% to 75%. The uniform burning and the good functioning of the above candles indicate that it is possible to use the 75 mm. powder in the C.N. candles. The necessity of so greatly decreasing the weight of C.N. per candle and the probability of material increase in the decomposition of the C.N., make it seem inadvisable to use 75 mm. powder as long as the .30 cal. powder is obtainable.

PB 20724. EVANS, S. M. Purification of brombenzylcyanide. (Edgewood Arsenal Chemical Div Rept 162) Jun 1922. 5 p. Price: Microfilm - 50¢ - Photostat - $1.00

The purification of the crude plant product by means of recrystallization from alcohol is described. The material obtained showed a purity of 99% by bromine analysis. The following data are given in the report: Properties, methods of analysis and tests, and experimental.

PB 20726. FABER, H. M. Life of silica gel. (Edgewood Arsenal Chemical Div Rept 185) Jun 1922. 16 p. Price: Microfilm - 50¢ - Photostat - $2.00
The life of silica gel together with its absorbtive capacity has been investigated under various conditions. A weighed sample of silica gel was saturated with a given vapor, the absorbed material distilled from the gel in a current of dry air, and the process repeated a number of times. From the original weight of the gel and its weight after absorption, the percent absorption was calculated. In none of the series run did the gel show any tendency towards disintegration; it being apparently in as good condition at the end as at the beginning of the runs. Tables and experimental data are included.

PB 19872. FRANTA, W. A. and others. A gelation test for the thickening power of IM polymer AE, in PT-1 incendiary mixture. (CWS Tech Div Memo Rept 1213) Mar 1946. 101 p. Price: Microfilm-$1.50 - Photostat-$7.00
This report describes work on the development of laboratory standards for characterizing IM (isobutyl methacrylate) polymer, which, when used as a component in PT-1 incendiary mixture, would uniformly result in a fuel or filling of the desired consistency and elasticity. The IM polymer AE was obtained by copolymerization of isobutyl methacrylate monomer with 0.03% of its own weight of methacrylic acid in a batch emulsion process. It was found that the gelling qualities of the polymer were dependent upon its methacrylic acid content and were increased by heating the polymer at 65°-80°C. Increasing the proportion of benzene as a solvent lowered but very slightly the elasticity of the gel. The tests and preparation of the test material are described, and tables and graphs of the various tests and photographs of the stirrers and agitators are given.

PB 20789. GILLETTE, ROY and ROSENSTEIN, DIETRICH. Specific developmental inhibitions produced in amphibian embryos by a nitrogen mustard compound. n.d. 28 p. Price: Microfilm-50¢ - Photostat-$2.00
The results of exposure of amphibian embryos reported in this study showed that proliferating regions were selectively effected to the exclusion of non-proliferating regions, and that furthermore, even within the single cell, proliferating was inhibited while other features of the cell gave the appearance of normal function. Bibliography and description of figures attached. The figures mentioned in the body of the report and attachment do not appear in this copy of the report.

PB 20677. HINE, T. B. The solubility of chloracetophenone in benzene, benzylchloride, nitrobenzene and chlorpicrin. (Edgewood Arsenal Chemical Div Rept 216). Oct 1923. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
The solubility of chloracetophenone in the listed solvents was measured at temperatures ranging from 3°C. to 30°C.

PB 20806. KLOSKY, SIMON and STRICKER, PAUL P. The physico chemical properties of methyl-di-chlorarsine, including some properties of arsenic trichloride. (Edgewood Arsenal Chemical Div Rept 63; Physical Dept Rept 12) Aug. 1921. 28 p. Price: Microfilm-50¢ - Photostat-$2.00
This report covers the following data on (a) methyldichlorarsine: Density, specific volume, coefficient of expansion, vapor pressure, latent heat of vaporization, boiling point, freezing point, decomposition temperature, heat of reaction and formation (b) arsenic trichloride: Vapor pressure, density, boiling point, melting point, specific heat and heat of formation.

PB 20643. KULP, R. D. The development of the manufacture of hexachlorethane. (Edgewood Arsenal Chemical Div Rept 272). Jun 1923. 28 p. Price: Microfilm-50¢ - Photostat-$2.00
This report is on the semi-works plant production of hexachlorethane by the reduction of carbon tetrachloride with aluminum metal, using aluminum chloride as a catalyst. Tables and diagrams, methods of analysis and testing, experimental data, and production costs are included.

PB 20681. KULP, R. D. and SMITH, C. H. The development of the manufacture of chloracetophenone on a semi-works basis. (Edgewood Arsenal Chemical Div Rept 222) Nov 1922. 43 p. Price: Microfilm-50¢ - Photostat-$3.00
Chloracetophenone (CN) has come to be recognized as one of the most important lachrymators. This report details the development of efficient methods for the manufacture of chloracetophenone and its intermediates, monochloracetic acid and chloracetylchloride. Included are flow sheets and diagrams of equipment.

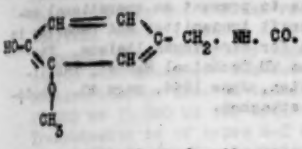
PB 20630. MACKALL, C. M. and MESCHTER, H. F. Investigation of methods for the preparation of methyl chlormethyl sulphide. (Edgewood Arsenal Chemical Div Rept 252) Feb 1923. 10 p. Price: Microfilm - 50¢ - Photostat - $1.00
Attempts have been made to prepare methyl chlormethyl sulphide by two independent methods, neither of which was successful. The first consisted in the chlorination of dimethyl sulphide by chlorine in carbon tetrachloride solution at 0°C. No definite product could be isolated. The second method, which was studied in greater detail, was based upon the reaction between para-formaldehyde, hydrochloric acid and methyl mercaptan. Two different procedures yielded thioformal instead of the chlor thio ether sought. The work involved the preparation of dimethyl sulphide and methyl mercaptan as intermediates. This compound is of interest because of its relation to mustard gas.

PB 20714. MESCHTER, H. F. Preparation of benzyl-dichlorarsine. (Edgewood Arsenal Chemical Div Rept 171) May 1922. 7 p. Price: Microfilm - 50¢ - Photostat - $1.00
Benzyldichlorarsine was prepared by the method of Michaelis and Paetow. Tribenzylarsine was first made by the action of sodium on a mixture of benzylchloride and arsenic trichloride in ether solution; this was then heated in a sealed glass tube with arsenic trichloride. The yield was very poor. An improvement on the original method for preparing the tribenzylchloride which resulted in a better yield consisted in cutting down the time of refluxing from 15 hours to 12 hours. The final product, as turned over to the Toxicological Department, was a colorless, oily liquid, analyzing 100% pure by chlorine. Toxicity tests showed that the lethal concentration for mice, for a ten minute exposure, was over 1.2 mg/l. A concentration of 0.05 mg/l, in the closed chamber, did not produce irritation in five minutes. Although the liquid produces painful blisters, no tests were made on vesicant properties. Due to the low toxicity and unstable nature of the compound it is probably of no value as a war gas.

PB 20787. MOREN, R. H. Chloracetophenone tolerance tests on man. (Edgewood Arsenal Chemical Div Rept 130) Apr 1922. 10 p. Price: Microfilm-50¢ - Photostat-$1.00
The object of this work was to ascertain the limit of tolerance possessed by man toward chloracetophenone at various concentrations. Results obtained in a closed chamber in which the chloracetophenone is volatilized by heating are not as satisfactory as those obtained in a chamber through which a given concentration of the material is continuously drawn. The resistance offered by the various individuals to a given concentration of chloracetophenone varies quite widely, making it difficult to obtain concordant results. Diagram and graph are included.

PB 20601. NELSON, E. K. and DAWSON, LOUIS E. The constitution of capsaicin, the pungent principle of capsicum. (Edgewood Arsenal Chemical Div Rept 69) Aug 1921. 28 p. Price: Microfilm-50¢ - Photostat-$2.00

The primary purpose of this investigation was to determine the structure of the decenic acid which occurs in capsaicin, thus establishing the complete structure of capsaicin. A secondary purpose was to investigate the relationships between the structure and pungency of compounds related to capsaicin. As a result of Nelson's work capsaicin has been proved, thus far, to be a condensation product of vanillyl amine (4-hydroxy-3-methoxy-benzyl-amine) and a decenic acid. It may be represented by the following formula:



Directions are given for the preparation of a number of decenic acids in an attempt to characterize the acid of capsaicin. Tables are given of the compounds related to capsaicin with the melting point and the pungency of each. The pungency is expressed as concentration of the pungent material in mgm. per 1000 cc. as reported from Edgewood Arsenal.

PB 20678. REED, A. B. Preparation of mercaptol. (Edgewood Arsenal Chemical Div Rept 217). Aug 1922. 4 p. Price: Microfilm-50¢ - Photostat-$1.00

This is a report on the preparation of the mercaptol, obtained by passing dry hydrochloric acid gas into a mixture of one mol of acetone and two mols of ethyl mercaptan. Its physical properties and toxicity are also given.

PB 20625. SATLER, L. L. and HENLEY, F. M. Research on the manufacture of monochloracetic acid, chloracetyl-chloride, and chloracetophenone. (Edgewood Arsenal Chemical Div Rept 1) Mar 1920. 35 p. Price: Microfilm - 50¢ - Photostat - $3.00

This is a report of research relative to the manufacture of chloracetophenone and its intermediate products on a commercial basis. Methods for identification, determination of purity, and purification of the products are discussed. Their physiological properties are briefly mentioned, but to such an extent that it gives sufficient information for plant operation. Operation instructions for the manufacture of each of the three substances are included. The work in this report is in addition to the previous work as described in volume 32 of the American University Monographs, May 1919. Graphs and a diagram are included in blueprint form, and they may not photograph well.

PB 20635. SCHUTON, H. A. Preparation of dichlor-dimethyl sulphide and attempted preparation of dichlor dimethyl sulphoxide and dichlor dimethyl sulphone. (Edgewood Arsenal Chemical Div Rept 267) Apr 1923. 12 p. Price: Microfilm - 50¢ - Photostat - $1.00

This report gives the experimental data for the preparation of dichlor dimethyl sulphide by the method of Bloch and Mohn (Ber. 55. 53, 1922). The sulphide obtained was practically colorless, distilled at 38.5°C. at 0.5 mm. pressure and had a purity of practically 100% by both chlorine and sulphur determination. The attempts to prepare the corresponding sulphoxide and sulphone from the dichlor dimethyl sulphide were unsuccessful and are discussed in the report.

PB 20667. SEATON, S. O. Preparation and stability of cyanogen bromide. (Edgewood Arsenal Chemical Div Rept 196) Jul 1922. 15 p. Price: Microfilm-50¢ - Photostat-$1.00

A method is described for the preparation of cyanogen bromide. The history, theory, properties, methods of testing and analysis, experimental data, including stability tests, toxicity, and bibliography appear in this report.

PB 20742. SIEGEL, MAURICE. The corrosive action of war gases on metals and materials. (Edgewood Arsenal Chemical Div Rept 113) Dec 1921. 76 p. Price: Microfilm-$1.00 - Photostat-$6.00

All quantitative data found in the technical files of the Chemical Division relating to the corrosive action of various war gases on metals, alloys, rubber, etc., have been collected. The data comprise results of experiments made at the American University Experiment Station and also such information as was placed on file there. This report also contains results of experiments completed at Edgewood Arsenal. From these data the penetration per month has been calculated and presented in the form of tables. The action of the metal on the gas is also presented. A bibliography on the corrosion of materials has been prepared with cross references in order that literature on a particular case may be readily available.

PB 19011. U. S. WAR DEPARTMENT. Chemical handling and loading equipment. (Tech Manual 3-255) Oct 30, 1943. 328 p. Price: Microfilm - $3.50 - Photostat - $22.00

This manual is for personnel charged with field filling of airplane smoke tanks and chemical munitions. It contains a complete description of smoke tanks and apparatus designed specifically for use with them, refers to filling apparatus discussed in other manuals, covers filling equipment not described elsewhere, and outlines various field filling procedures. The equipment is divided into the following classifications: Airplane smoke tanks, filling lines, bulk containers, handling equipment, and transportation. Safety precautions are given. Photographs are used to illustrate the text.

PB 19010. U. S. WAR DEPARTMENT. Storage and shipment of dangerous chemicals. (Tech Manual 3-250) Dec 5, 1940. 128 p. Price: Microfilm - $1.50 - Photostat - $9.00

The purpose of this manual is to present for the guidance of property officers instructions for storing, handling, packing, shipping, and surveillance of all classes of chemicals stored and used by the Chemical Warfare Service. In this manual chemicals have been divided into the following classes: Explosives, inflammable liquids, inflammable solids, oxidising materials, corrosive liquids, compressed gases, toxic chemicals, semihazardous chemicals, and unclassified chemicals.

PB 20640. WALKER, H. W. The vertical dispersion of smoke clouds and a discussion of the factors influencing the same, including tabulation and formulae based on field data. (Edgewood Arsenal Chemical Div Rept 269) Jul 1923. 78 p. Price: Microfilm - $1.00 - Photostat - $6.00

A study of data on approximately 300 W.P. and B.N. candle clouds showed the chief factors influencing vertical dispersion of smoke clouds to be: 1. Wind velocity, 2. variability of the wind in both velocity and direction, and 3. character of the terrain. From the data on hand, there seemed to be no noticeable relation between the rate of rise of the cloud and (a) the temperature difference between the ground and the air, and (b) the time of day at which the test was held. An empirical formula is given which was developed from the observed data for the rate of rise of smoke clouds. The data for field tests are tabulated and the calculations from these data are included in tables 2 and 3. The upper edge of any smoke cloud is best designated by a straight line. That is, the rate of rise for each individual cloud is practically constant. Graphs and tables are included.

PB 20688. WITHERSPOON, S. G. Preparation of methylchlorethyl sulphide, methylchlorethyl sulphoxide and methylchlorethyl sulphone. (Edgewood Arsenal Chemical Div Rept 231). Dec 1922. 9 p. Price: Microfilm-50¢ - Photostat-$1.00

This report is concerned with the history, theory, properties, methods of analysis and preparation, and toxicity of these compounds.

ELECTRICAL MACHINERY, EQUIPMENT, AND SUPPLIES

Communication Equipment

German

PB 19747. ALLIED FORCE HEADQUARTERS. SIGNAL SECTION. 849TH SIGNAL INTELLIGENCE SERVICE. German pack radio sets, Tornister Fu f and Fu bl. Mar 1943. 24 p. Price: Microfilm - 50¢ - Photostat - $2.00
The captured German radio set Torn Fu bl (Tornister Funkgerät bl) is a low-powered, medium frequency transmitter-receiver communications set capable of being transported and operated by two men. The Torn Fu f (Tornister Funkgerät f) is identical with the Torn Fu bl except for transmitter frequency (the Torn Fu f having a range of 4500 to 6700 kc, and the Torn Fu bl a range of 3000 to 5000 kc). The transmitter consists of two radio frequency stages; emission is of types A-1 and A-3; and the power output is approximately 0.65 watts. An unusual type of frequency calibration utilizing only a quartz crystal is incorporated in the transmitter. The receiver is a six-tube superheterodyne employing only one type of tube (RV2P800). The frequency range is from 3000 to 6700 kc. Performance compares favorably with our older equipment. Appended are photographs, circuit diagrams, and nomenclature of parts.

PB 9280. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Drahtlose uebertragungseinrichtung. (Wireless transmission arrangement). German patent application T57305 VIIIa/21a4. Apr 28, 1942 still pending. Inventor: Grimm. 1942. 2 p. Price: Microfilm-50¢ - Photostat-$1.00
Illustrated.

PB 9260. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Gebeeinrichtung für schnelltelegraphie. (A transmitter for high-speed telegraphy) German patent application T57179 VIIIa/21a1 Apr 2, 1942 still pending. Original inventor: Dr. Mailandt. 1942. 10 p. Price: Microfilm-50¢ - Photostat-$1.00
Illustrated. The new method accomplishes the transmission of code at speeds higher than 1/100 sec. in order to transmit short messages at very high speed before transmitter may take bearings.

PB 9275. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Mikrofonbesprechungsanlage. (A public address system) German patent application T57265 VIIIa/21a2 Apr 23, 1942 still pending. Original inventor: Neulen. 1942. 5 p. Price: Microfilm-50¢ - Photostat-$1.00
Illustrated.

PB 9272. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Mikrofonbesprechungsanlage für kommandozwecke, insbesondere für abrufanlagen von strassenbahnhaltestellen. (A public address system, especially for announcing street car stops). German patent application T57264 VIIIa/21a2 Apr 21, 1942. Original inventor: Neulen. 1942.
4 p. Price: Microfilm-50¢ - Photostat-$1.00
Illustrated.

PB 9268. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Schaltungsanordnung für die wechselseitige übertragung von mehreren nachrichten mittels eines übertragungskanals. (An arrangement for the alternate transmission of several messages over one transmission channel). German patent application T57227 VIIIa/21a2 Apr 14, 1942 still pending. Original inventor: Dr. V. Baeyer. 1942.
5 p. Price: Microfilm-50¢ - Photostat-$1.00
Illustrated.

PB 9273. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Tonabnehmertragarm für magnetsprechmaschinen (Pickup arm for record changing phonographs). German patent application T57252 IIa/42g Apr 2, 1942 still pending. Original inventor: Dr. Hagen. 1942. 5 p.
Price: Microfilm-50¢ - Photostat-$1.00
Illustrated.

PB 19745. U. S. THIRD ARMY. SIGNAL SECTION. Field report on truck-mounted radio station Fu. G 10. (Enemy equipment Intelligence Service Rept 8-F5). Feb 1945. 4 p.
Price: Microfilm-50¢ - Photostat-$1.00
The purpose of this report is to present an operational employment of the Fu. G 10 aircraft transmitter and receiver in a mobile ground installation for air-ground liaison. The equipment is described in the WD Technical Manual, TM 11-227, German Radio Communication, June 1944, page 40. Photographs of the equipment are attached.

PB 19739. U. S. THIRD ARMY. SIGNAL SECTION. German "Berliner Telephone" (Test phone) (Enemy Equipment Intelligence Service Rept 8-46) Jul 1945.
4 p. Price: Microfilm - 50¢ - Photostat - $1.00
This telephone, captured at Nürnberg, is apparently used as a test phone. It will operate on either a local or common battery circuit. It was manufactured by Ferdinand Schuchhardt, Berliner Fernsprech and Telegraphenwerk. Wiring diagram and photographs are included.

PB 20318. U. S. WAR DEPARTMENT. SIGNAL CORPS. German radio transmitter 80 W.S.a. Jan 1944. 13 p.
Price: Microfilm-50¢ - Photostat-$1.00
The 80 W. S. a. is a vehicular type medium frequency radio transmitter which operates from a 12-volt dynamotor power supply unit type C80a. It consists of an RL12P35 pentode tube in a tuned-grid oscillator circuit which is capacitively coupled to an r-f amplifier using a pair of the same type tubes connected in parallel. Interconnections between the transmitter and receiver permit the transmitting antenna to be used for reception in the "Off" and "Standby" positions of the main switch. Both voice and telegraph transmissions are monitored by the receiver. Photographs, a panel sketch, a parts list and circuit diagrams are included.

PB 20331. U. S. WAR DEPARTMENT. SIGNAL CORPS. German VHF receiver, Ukw. E. f1. (Allied Forces Enemy Equipment Intelligence Service Rept 48) Sep 1944.
10 p. Price: Microfilm-50¢ - Photostat-$1.00
The Ukw. E. f1. is a compact portable one-band VHF radiotelephone receiver with self-contained power supply. Five identical tubes are used in a superheterodyne circuit. It probably is used as a separate receiver, and also, in conjunction with the transmitter 20 W.S.d., forms a complete station. The frequency range, 42-48 mc., also corresponds to that of the airborne command set Ful7. The receiver consists of one r-f stage, a converter, one i-f stage, a regenerative detector, and one audio amplifier stage, all tubes being RV2.4P700 pentodes. The condensers of the four tuned circuits are ganged. A small tuning condenser, C19 in the converter circuit permits fine adjustments to either side of the frequency given by the tuning dial. Photographs, a parts list and circuit diagram are included.

Italian

PB 19749. ALLIED FORCE HEADQUARTERS. SIGNAL SECTION 849TH SIGNAL INTELLIGENCE SERVICE. Italian radio set, Stazione R.F.2. May 1943. 12 p. Price: Microfilm - 50¢ - Photostat - $1.00
This Italian radio set captured on the Tunisian front, is a portable low power communications set, manufactured by SAFAR Milan and Rome. Set consists of two moderately sized packs, the transmitter-receiver unit being in one, and the batteries and accessories in the other. Trans-

mitter has a power output of 4½ watts for A1 emission and about 3 watts for A3 emission. The frequency range is from 2720 to 4290 kc. The set can receive A1, A2 and A3 signals. Frequency range is the same as that of the transmitter and the tuning is accomplished by the same dials. The receiver is a six-tube superheterodyne, with one radio frequency stage, two intermediate frequency stages, and a single audio stage. Photographs and circuit diagram are attached.

PB 19748. ALLIED FORCE HEADQUARTERS. SIGNAL SECTION. 849TH SIGNAL INTELLIGENCE SERVICE. Italian radio set, TR 7. Apr 1943. 13 p. Price: Microfilm - 50¢ - Photostat - $1.00
This report on the Italian radio set, captured on the Tunisian front, is based only on the transmitter-receiver component since the power supply, antenna and other accessories were missing. The set is a communications transmitter-receiver used in tanks. The frequency range is from 27,000 to 33,600 kc for both transmission and reception. Transmission is of types A-2 and A-3 only. Operation is not difficult for non-technical personnel. Four frequencies can be readily preset by a simple mechanism. Power input to the power amplifier is approximately 15 watts. An eight-tube superheterodyne circuit is used for reception. Photographs and circuit diagram are attached. A supplement to this report covering the instruction manual and the remainder of the equipment may be found in PB 19751.

PB 20316. U. S. WAR DEPARTMENT. SIGNAL CORPS. Italian photophone. (Allied Forces Enemy Equipment Intelligence Service Rept 26) Jan 1944. 14 p. Price: Microfilm-50¢ - Photostat-$1.00
The Italian photophone manufactured by Cinemeccanica, Milan, is an apparatus for transmitting telephonic communication between two mutually visible points over a light beam that varies in intensity. The variation is accomplished by a microphone and single-stage speech amplifier in conjunction with a push-pull-stage modulator that varies the current to the lamp. The communication range is 6 kilometers (3 3/4 miles) by day, increased by night. It is also used as an ordinary visual signal lamp for transmission of telegraphic signals. An auxiliary unit consisting of a single tube VHF plate modulated transceiver was found with this set to be used in conjunction with similar apparatus at another photophone station to communicate without using the light beam. Photographs and circuit diagram are included.

PB 20315. U. S. WAR DEPARTMENT. SIGNAL CORPS. Italian unintercseptable field telegraph set, model 1931. Jan 1944. 9 p. Price: Microfilm-50¢ - Photostat-$1.00
This telegraph set is a portable field unit, manufactured by C. Paccagnini, Milan, designed to be the main component of the so-called unintercseptable telegraphy station. Normally employed in conjunction with an Italian field telephone it can be employed between any two command posts that have a two-wire circuit connecting them. It operates on a principle similar to our EE-1-A, except that it employs a vibrator in place of a "hummer". Power supply is a 1½ volt dry cell. Photographs and a circuit diagram are attached.

Japanese

PB 17527. CONNER, H. H. Japanese Type 136 Model A Intercept Receiver. (OTI Rept 3). n.d. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
This receiver was designed to cover a frequency range from 1.5 mc to 20 mc in eight bands with facilities for direction finding. Band switching is accomplished by means of a rotary drum containing a set of coils for each band. As the drum is rotated a new set of coils is plugged into the circuit with knife switch contacts. Above 7 mc the band switch also changes the circuit to a double IF superheterodyne with a crystal 2nd local oscillator. A regenerative type of detector is used to provide high gain detection and CW reception. Only one type of tube, the UY1A, is used throughout the receiver. The receiver is poorly laid out with unnecessarily long leads which are detrimental to the operation of the set. The wiring and soldered joints are poor. The band switching mechanical arrangement is fairly rigid but the rest of the set is mechanically poor.

PB 17529. OVERHOLT, J. H. Special telephone. (Japanese Signal Equipment). (Ordnance Technical Intelligence Rept 6). n.d. 6 p. Price: Microfilm-50¢ - Photostat-$1.00
The equipment is a simple local battery telephone isolated from the line by means of a repeater coil in order to match the impedance of the input of an amplifier, and with several unique signalling devices. This unit is probably used as a means of controlling gun fire at the gun positions from some remote position. It is a late model probably intended as a replacement. There is no data available on this telephone unit, but the following assumptions have been made, based on the circuit diagram and known standard practices of the Japanese: (a) The reversing of the polarity of the rectified calling signal in the two latter methods indicates that this telephone is used through a switchboard using a d/c power supply for ringing, and polar relays with two different signalling devices in the switchboard, such as a light on one side of the relay to denote a normal call (direct) and a buzzer on the other side to denote a priority call (command). This would account for the reversing of the polarity to ring off when using the "Direct" method. (b) It is possible that the command telephone (at higher echelon) is connected directly to both a switchboard and another telephone (s), and the reversing feature is used to select either the switchboard or the telephone (s) by means of the polar relays.

United States

PB 17982. COLLINS RADIO COMPANY, CEDAR RAPIDS, IOWA. Instruction book for Navy model TCC-3 radio telegraph and telephone transmitting equipment, nominal power output 1000 watts, type of emission CW, MCW, telephone, frequency range 2000 kc to 18,000 kc. Feb 1941. 185 p. Price: Microfilm-$2.00 - Photostat-$13.00
This transmitting equipment was designed for applications involving commercial point-to-point communication, aeronautical ground station, and long distance transoceanic services requiring operation on a number of readily selected frequency channels. The equipment consisting of two cabinets or bays and a remote operator's control unit, is designed for general operating conditions in the temperature range between 10° C. and +50°C. The frequency of the transmitter is controlled by means of quartz crystals which are held at constant temperature for maximum stability. The equipment is designed for operation from a 220 volt, 3 phase, 60 cps power source. Included are detailed description of the component parts and their operation; instructions for installation, adjustment, operation and maintenance; parts list; photographs; schematic diagrams; wiring diagrams; and drawings.

PB 17983. COLLINS RADIO COMPANY, CEDAR RAPIDS, IOWA. Instruction book for Navy model TCH radio telephone and telegraph transmitting and receiving equipment; output 15 watts telegraph, output 5 watts telephone, frequency range 2.0 to 16.0 mc. Jul 1940. 54 p. Price: Microfilm-$1.00 - Photostat-$4.00
The equipment covered by this instruction manual is a complete radio transmitting and receiving installation for portable and mobile services requiring unusual reliability and flexibility. The receiver uses a sensitive superheterodyne circuit arranged for crystal controlled or continuous tunable operation in the medium and high frequency bands. The transmitter will deliver from 5 to 15 watts output on medium and high frequencies, and uses an oscillator-amplifier circuit, with provision for two crystal controlled frequencies or for continuous master oscillator coverage. The equipment is arranged for push-to-talk and break-in operation on Voice and CW, but duplex operation is not provided. The receiver covers the frequency range 2 to 16 megacycles in 3 bands. Power supplies are available for operation on 12 volts d.c., 24

volts d.c., 32 volts d.c., 115 volts 60 cycle a.c., and 115 volts d.c. Detailed descriptions of the component parts and their operation; instructions for installation, operation, maintenance and service; photographs; wiring diagrams; and drawings are included.

PB 17927. COLLINS RADIO COMPANY, CEDAR RAPIDS, IOWA. Instruction book, model TCB radio telephone and telegraph transmitting equipment. Apr 1939. 129 p. Price: Microfilm-$1.50 - Photostat-$9.00
The model TCB equipment manufactured for the Navy Department is designed for general communication service in the frequency range 1500 to 15,000 kc. A nominal power output of 150 watts, type A1, A2, or A3 emission, is available on any one of 10 preselected frequencies. The Collins Autotune System, included in the design, provides selection of the desired frequency within 3 seconds. Normal operation of the transmitter, including starting, stopping, emission selection, frequency selection, modulation, and keying, is accomplished over a single audio telephone circuit. The apparatus may also be operated from a station control unit. The book contains sections on description, installation, adjustment, maintenance, performance data, parts lists, and tube data. Photographs and diagrams are included.

PB 17928. COLLINS RADIO COMPANY, CEDAR RAPIDS, IOWA. Instruction book: Navy model TCB-1 radio telegraph and telephone transmitting equipment, nominal power output 75 watts; type of emission CW, MCW, telephone; frequency range 1500 kc to 12,000 kc. Feb 1941. 183 p. Price: Microfilm-$2.00 - Photostat-$13.00
The model TCB transmitting equipment is composed of the radio transmitter 16E and associated control equipment. The transmitter is capable of operating on any frequency within the range 1500 to 12,000 kc, with a nominal power output of 75 watts throughout the frequency range. It employs the Autotune system of multifrequency operation. The type of emission is CW(a-1), MCW(a-2), and telephone (a-3). General characteristics of the unit, and circuit functions are followed by instructions for the installation, adjustment and operation of the equipment and its components. Parts lists, color code, vacuum tube data, coil winding data, tuning charts, tables of typical meter readings, typical voltages, and typical audio frequency data are given. Tables, illustrations, charts, photographs, curves, schematic and wiring diagrams are included.

PB 22181. CUTTING, FULTON. A. J. considerations in receivers. (Sig Corps Rept CRC-SS-1). Mar 1943. 6 p. Price: Microfilm-50¢ - Photostat-$1.00
The prime requirement for a receiver which is to be used in the presence of jamming is that it should not overload. It is necessary to reduce the interference to a size comparable to that of the signal. If this can be done, further amplification can then be employed to bring the signal up to usable size. Two ways of doing this are high level blanking and low level or threshold blanking. Two schematic drawings are attached.

PB 18006. FADA RADIO AND ELECTRIC COMPANY, INCORPORATED, LONG ISLAND CITY, N. Y. Instruction book for Navy model RBR receiver pocket radio receiving equipment. May 1942. 45 p. Price: Microfilm-50¢ - Photostat-$3.00
The instructions cover detailed description, installation and operation of the above named equipment. Photographs and diagrams are attached. This radio receiving equipment is designed to serve as a portable radio receiver intended to be carried in two uniform pockets. Antenna consists of a single opened turn of wire contained in a web belt to be fastened around the user's body. Headphones are provided to be mounted in suitable helmet or other head-gear. All operating power is derived from self-contained dry batteries, capable of providing 10 hours continuous or 25 hours intermittant operation. Frequency range: 2 to 9 mcs in 3-bands. Weight of equipment 3½ lbs. Equipment was made for the Navy Department, Bureau of Ships.

PB 18087. FEDERAL TELEPHONE AND RADIO CORPORATION, NEWARK, N. J. Instruction book for Navy model TCY equipment. n. d. 19 p. Price: Microfilm-50¢ - Photostat-$2.00
Radio transmitters 168A and 168C are portable emergency equipments designed for operation by untrained persons, and quickly adaptable for use in lifeboats, liferafts, or shipboard, or wherever required. The transmitters are identical except for minor details in the carrying cases. Power output is 5 watts; duration of operation is 48 periodic operations, or 1½ hours continuous keying; the frequency of operation is 500 kc; and emission is A2, modulated in excess of 70% at approximately 1000 cps. It is fully automatic in operation and transmits either the international "SOS" distress signal or the "SSS" signal for approximately 2½ minutes after the "start" button is pressed. Photographs and a schematic diagram are included.

PB 17958. GAROD RADIO CORPORATION, BROOKLYN, N. Y. Preliminary instruction book for Navy Model TEL-4 portable radio equipment, including Models EF, EG, EH and EJ series of auxiliary power equipments, and Models EL, EM, EN, EO, EP and EQ series of receiver power equipments. (Hazeltine part IB-153-A) Nov 1942. 89 p. Price: Microfilm-$1.00 - Photostat-$6.00
This equipment is composed of three major units and accessory equipment. The major units are transmitter-receiver, receiver power supply and transmitter power supply. It is for use in communication at ranges of approximately 30 miles for CW transmission and 15 miles for phone transmission. The transmitter operates between 2000-4525 kcs. at 9 watts for CW and at 5 watts for phone. Self excited transmission is possible at any frequency in the above range: CW and phone crystal-controlled transmission is possible at any two frequencies in the band for which crystals are provided. The receiver operates in the frequency range 2000-8000 kcs. on CW and MCW. A description of the power equipment characteristics and information on constructional features, basic field equipment, power supply, antennas and vacuum tubes is followed by instructions for installation, operation and maintenance of the equipment and its component parts. Dimensions, weights and a parts list are included and photographs, drawings, schematic diagrams and wiring diagrams illustrate the manual. A supplement dated November 1943 lists improvements in design.

PB 17959. GAROD RADIO CORPORATION, BROOKLYN, N. Y. Preliminary instruction book for Navy model TEL-5 portable radio equipment. (Garod part IBT-5) Jun 1943. 64 p. Price: Microfilm-$1.00 - Photostat-$5.00
Instructions for installation, operation and maintenance of these portable radio equipments, manufactured for the Bureau of Ships, Navy Department, are covered in this report. The transmitter covers the frequency range 2000 - 8000 kc. Self-excited transmission is possible at any frequency in this range: CW and phone, crystal-controlled transmission is possible at any two frequencies in the band for which crystals are required. The radio receiver covers CW and MCW at any frequency in the range, 2000 - 8000 kc. The transmitter is designed to operate from the following power supply which is furnished with each basic equipment: Hand-driven d-c generator Type 21263A rated 500/12.6 volts, 0.065/0.86 amp d-c, 60 rpm crank speed. Models, EF, EG, EH and EJ auxiliary power equipments are also supplied for operation of the transmitter. The receiver power equipments are capable of supplying adequately filtered, polarized and isolated filament, plate, screen, and bias voltages of 3,135, 90, 6 and 15 volts, respectively. The models EM, EN, EO, EP and EQ series of receiver power equipments supplied are all dynamotor-operated d-c equipments. The model EL series are rectifier-operated a-c equipments. Accessory Box Type-100 26A supplied contains batteries for the receiver power. Parts lists, photographs, schematic, connection and outline drawings are included.

PB 17792. GENERAL ELECTRIC COMPANY. Instruction book for Navy model TAJ-6 radio telegraph transmitting equipment. (GEI-8689A) Mar 1936. 112 p. Price: Microfilm-$1.50 - Photostat-$8.00

This transmitting equipment is designed for use where a compact, medium-power, intermediate-frequency transmitter is required. Frequency range 175 - 600 kc; power output of not less than 475 watts CW within band of 175 to 355 kc., not less than 460 watts in the band of 355 to 500 kc, and not less than 445 watts in the band of 500 to 600 kc. The equipment operates on 440 volt, 3 phase, 60 cycle power supply. The instructions cover installation, operation, and servicing of the equipment. Tables, photographs, diagrams, schematic diagrams, graphs, and commercial bulletins are attached. The equipment was manufactured for the Navy Department, Bureau of Engineering.

PB 17461. GENERAL ELECTRIC COMPANY. Instruction book for Navy model TBC-4, radio telegraph transmitting equipment. (GEI-18454) Jul 1943. 455 p. Price: Microfilm-$5.00 - Photostat-$31.00
This equipment is designed primarily as the main high-frequency transmitter for shore to ship service and is to be used at Naval shore stations. Three types of keying are employed, relay keying, facsimile keying, and D-C line keying. The complete equipment operates on a power supply of 230 volts, 3-phase, 60 cycles. Approximately 100 KW of power are required. This radio transmitting equipment is capable of continuously variable adjustment to, and operates at any frequency in the specified range, 4000 to 26,000 KC with a power output of 37 to 51.5 KW when working into antenna systems as described in the text. Component units, frequency range, methods of signalling, antenna characteristics, rating, power supply, vacuum tubes, construction, installation, theory of operation, adjustments, maintenance, location and correction of troubles are subjects covered in the text. Tables, outline drawings, diagrams, graphs, installation drawings, schematic diagrams and commercial bulletins are attached.

PB 17836. GENERAL ELECTRIC COMPANY. Instruction book for Navy models TBR and TBR-1 radio transmitting and receiving equipments. (GEI-9677B) Oct 1944. 320 p. Price: Microfilm-$3.50 - Photostat-$22.00
The report consists of four instruction manuals: TBR and TBR-1 semi-portable radio, telegraph, and telephone transmitting equipment; TBR and TBR-1 gasoline-engine-driven generator set; TBR and TBR-1 radio transmitting and receiving equipments for base station use; and radio receiving system for model TBR/TBR-1 semi-portable equipment. Together they give installation, operation, and maintenance instructions for establishing a complete semi-portable radio station shore or afloat. The transmitting equipment has an output of 100 to 150 watts, CW, MCW, and phone emission, an a range of 2000 to 18,100 kc. for the TBR model and 300 to 18,100 kc. for the TBR-1. The gasoline-engine-driven generator set, Navy type CG-73000 consists of a single cylinder gasoline engine, a generator, a control panel and a bed plate on which the other units are assembled. The generator unit consists of an alternator and an exciter. The receiving units for the system are manufactured by RCA Victor Division of the Radio Corporation of America and comprise a receiver unit and a receiver power unit. The receiver covers the frequency range of 0.3 to 23.00 mc and is designed for reception of pure, modulated, or interrupted CW, damped radio telegraph signals, or voice-modulated CW. Illustrations include tables, photographs, diagrams and outline drawings. These equipments were manufactured for the Bureau of Engineering, Navy Department.

PB 17931. GENERAL ELECTRIC COMPANY. Instruction book for Navy model TCL-1 FM radio transmitting and receiving equipment. (GEI-18616A) Jun 1942. 100 p. Price: Microfilm-$1.00 - Photostat-$7.00
The Navy model TCL-1 FM equipment comprises a frequency-modulation transmitter and a frequency-modulation receiver of conventional emergency communication design mounted in a single cabinet, together with necessary power-supply and control equipment. The nominal power emission is 5 watts, emission is F-15, and frequency range is 30 to 42 mc. Remote control unit type CG-23249 permits complete remote control of the equipment. Two keyed-tone communication channels are provided, operating independently with the same carrier. The transmitter and receiver are of conventional commercial design and are described in two instruction booklets (attached to the report) on normal operation for commercial emergency communication service.

PB 17963. GENERAL ELECTRIC COMPANY. Instructions for 2KW. radio telegraph transmitting equipment, Model TAB-4. (GEI - 6092). Mar 1932. 132 p. Price: Microfilm-$1.50 - Photostat-$9.00
The Model TAB-4 transmitter and associated equipment is designed for Navy shore station service where a compact, medium power, intermediate frequency transmitter is required. CW and MCW emission over a frequency range of 100 to 555 kc is provided with a power output of 2 kw. The following subject material is included in the instructions: Component units, antenna characteristics, frequency range, method of signaling, rating, vacuum tubes, power supply, construction, installation, operation, adjustment and maintenance. The enclosures consist of photographs, drawings, outlines, diagrams, schematic diagram, and graphs.

PB 17961. GENERAL ELECTRIC COMPANY. Instructions, Model TAJ-2 500 watt output radio telegraph transmitting equipment. (GEI-5747A) Jun 1932. 114 p. Price: Microfilm-$1.50 - Photostat-$8.00
The TAJ-2 transmitter and associated equipment, manufactured for the Navy Department, Bureau of Engineering and designed for service on Navy vessels, is a compact, low power intermediate frequency transmitter capable of continuously variable adjustment to, and operation at, any frequency in the specified frequency range of 195- 600 kc. Power output during MCW transmission will be not less than 60% of that obtained during CW transmission. Instruction for the installation, adjustment and maintenance of the transmitter and component parts follows the theory of operation. Photographs, drawings, schematic and connection diagrams, curves, tables and parts lists are included.

PB 17836. GENERAL ELECTRIC COMPANY, RADIO TRANSMITTER ENGINEERING DEPARTMENT. Model RAX-1 receiver test data. Mar 1943. 43 p. Price: Microfilm-50¢ - Photostat-$3.00
Test data on three channels of the RAX-1 receiver are given in tabular form.

PB 17812. HAMILTON RADIO CORPORATION, NEW YORK, N. Y. Instruction book for Navy model TCS-13 radio telephone and telegraph transmitting and receiving equipment, output 25 watts telegraph or 10 watts telephone, frequency range 1500 kc to 12,000 kc. Sep 1943. 106 p. Price: Microfilm-$1.50 - Photostat-$8.00
This instruction book describes the TCS-13 equipment and gives instructions for installation, adjustment, operation, maintenance and service of the equipment. This is a complete radio transmitting and receiving installation designed for mobile and portable services. The transmitter is designed for CW or voice transmission and covers the frequency range of 1500 kc to 12,000 kc in three bands. Either master-oscillator controlled or crystal-controlled operation is available. The audio-frequency distortion is less than 10% root-mean-square, measured with 90% modulation at 400 cycles. The power output is 20 watts on voice and 40 watts on CW. The receiver covers the same range as the transmitter and employs a sensitive superheterodyne circuit, which will deliver 6 milliwatts audio power with less than 15 microvolts input throughout its frequency range. The manual contains a parts list, photographs, and diagrams.

PB 18090. HYGRADE SYLVANIA CORPORATION, CLIFTON, N. J. Instruction book: Radio transmitting equipment Model TAZ-1. May 1933. 99 p. Price: Microfilm-$1.00 - Photostat-$7.00
This model is a transmitter having an output of 200 watts in the frequency ranges 300 to 600 kilocycles and 2000 to 18,100 kilocycles and was designed for service on naval vessels. CW and MCW emission is provided. The rectifier unit,

Type CRS-20012, operates from a 230 volt, 3 phase, 60 cycle power supply. Descriptions of the component parts and their operation are given, together with instructions for installation, operation and maintenance. Included also are photographs, schematic drawings and wiring diagrams, list of parts, and tube and relay instruction sheets.

PB 17830. LINK, FRED M., NEW YORK, N.Y. Preliminary instruction book for radio transmitting and receiving equipment Model MM-5. Nov 1944. 64 p. Price: Microfilm-$1.00 - Photostat-$5.00
This instruction book covers the installation, operation, and maintenance of the above named transmitting and receiving equipment, consisting of a low power frequency modulated radio telephone transmitter, an f-m radio telephone receiver, and a power supply capable of operating on several standard supply voltages. Handset, handset mounting hook, loudspeaker, cables, remote control unit, and antenna are supplied as accessories. The equipment is intended to provide short-range radio telephone communication between the equipments which may be installed on ship, on land, or in aircraft. Frequency range: 30 - 42 megacycles. Power output: Adjustable, 0-2 watts. Powe: supply: (a) 115 volts 50-400 cycles I phase AC, 80 watts; or (b) 13.5 volts DC 6 amperes; or (c) 27.0 volts DC 3 amperes. The transmitter-receiver type CFL-43059 is a 16 tube combination transmitter, receiver and power supply assembled on a single chassis. FM is employed for maximum intelligibility and freedom from interference and for maintaining the radiated signal at a minimum. Tables, photographs, diagrams, and schematic diagram appear throughout the text or at the end. The equipment was manufactured for the Navy Department, Bureau of Ships.

PB 17948. NATIONAL COMPANY, INC., MALDEN, MASSACHUSETTS. Instruction book for radio receiving equipment, Model RAS. Jun 1939. 84 p. Price: Microfilm-$1.00 - Photostat-$6.00
The frequency range of the radio receiver is 190 to 30,000 kilocycles. The book contains sections on the following subjects: Installation, construction, circuit description, operating instructions, test data, alignment data and parts list. Diagrams and photographs are included.

PB 17967. NATIONAL COMPANY, INC., MALDEN, MASS. Instruction book for radio receiving equipment Model RBJ-2. Aug 1941. 85 p. Price: Microfilm-$1.00 - Photostat-$6.00
This receiver, designed for use at Naval radio shore stations or aboard Naval vessels, is a nine tube, rack mounted superheterodyne utilizing plug-in coil sets to cover a frequency range of from 50 to 400 kcs. and from 480 to 30,000 kcs. The receiver operates from a separate power unit of 110-120 volts, 50-60 cycles, single phase. Subject matter covered is: General description, description of major units, tube compliment, power and antenna requirements, installation, construction, circuit description, operating instructions, performance data, maintenance, failure and remedies, test data, alignment data, parts lists, diagrams and photographs.

PB 17448. NATIONAL COMPANY, INC., MALDEN, MASS. Instructions for radio receiving equipment model RAS-2. Nov 1940. 85 p. Price: Microfilm-$1.00 - Photostat-$6.00
The model RAS equipment is a complete radio receiving set suitable for receiving radio telephone or telegraph signals (either CW or MCW) by either headphone or loud speaker, is operable on a frequency range from 190 to 30,000 kc from 110/120 volts A.C., either 50/60 cycle or 25 cycle as may be designated on the name plate of the power unit. The instructions cover the construction, circuit description, operation and maintenance, data on performance, test and alignment. There are 53 drawings, diagrams and photographs including a schematic diagram attached. The equipment was made for the Navy Department, Bureau of Engineering.

PB 18007. NATIONAL COMPANY, INC., MALDEN, MASSACHUSETTS. Preliminary instruction book for Navy model RBL-5 and RBL-6 radio receiving equipment. Sep 1943. 80 p.
Price: Microfilm-$1.00 - Photostat-$4.00
This equipment is suitable for radio stations ashore or afloat. It may be used for reception of radio telephone and telegraph signals (either CW or MCW) when detector radiation measured at the antenna input circuit must be less than 400 micro-micro-watts. It is intended to operate from a 115 volt, 50-60 cycle A. C. supply source or from batteries or other D. C. sources capable of supplying 6.3 volts D. C. at 2.2 amperes and 130 volts D. C. at 30 milliamperes. Normal power consumption on A. C. is 45 watts. Frequency range - 15 to 600 kc. The text includes a general description, installation, operating, and maintenance instructions. Tables, diagrams, and schematic diagram are attached.

PB 17450. NATIONAL COMPANY, INC., MALDEN, MASS. Preliminary instruction book for radio receiving equipment model RBL. Sep 1941. 33 p. Price: Microfilm-$0.50 - Photostat-$3.00
This preliminary instruction book covers installation, operation, and maintenance for model RBL radio receiving equipment which is suitable in all respects for use at Naval Radio shore stations or aboard Naval Vessels. The equipment is designed for the reception of radio telephone (MCW) or radio telegraph (either CW or ICW) signals by headphone methods. The frequency range is 15 to 600 kc. It is table mounted and operates from a 115 volt 50/60 cycle AC supply source. Provision is made for operation from a battery source. The normal power consumption is 45 watts. The correct load impedance for the phone output circuit is 600 ohms. The instruction book contains a schematic diagram, a coil switch diagram, outline drawings, and a spare parts list. The equipment was manufactured for the Navy Department, Bureau of Supplies and Accounts.

PB 18074. PANORAMIC RADIO CORPORATION, NEW YORK, N.Y. Preliminary instruction book for Navy model RCD panoramic radio receiving equipment. Nov 1942. 106 p.
Price: Microfilm-$1.50 - Photostat-$7.00
This equipment consists of a power supply unit, a receiver unit, a panoramic unit, and a cabinet. The receiver unit operates as a normal, highly selective superheterodyne having a frequency range from 4.0 to 27.0 mc. The use of the panoramic unit enables the operator to intercept any stations appearing on the air, even though they may transmit for short periods of time. It is a device which provides an instantaneous picture of a considerable portion of the RF spectrum and allows the operator to determine, at a glance, the frequencies, amplitudes, and types of signals present at that moment. On the horizontal axis of the screen (base line) frequencies are shown, and on the vertical axis the signal amplitudes are given. The maximum sweep-width is one megacycle. Operating and servicing instructions are given in this handbook, and there are circuit diagrams and photographs.

PB 17988. PRESS WIRELESS, INC., NEW YORK, N. Y. Preliminary instruction book for Navy model TEC radio telegraph transmitting equipment; frequency range 4000-21,00 k., output 40,000 watts. n. d. 202 p.
Price: Microfilm-$2.50 - Photostat-$14.00
Radio transmitter TEC is designed for radio-telegraph operation over a frequency range of 4,000 to 21,000 kc with a power output of 40 kw over the entire frequency range. The transmitter can be keyed at speeds up to 400 words per minute and maintain good wave form. The circuit is designed for A-1 (carrier On-Off) emission; however, provisions have been made for connecting an external frequency shifter for teletype operation. The output circuits are designed to work into a balanced 2-wire transmission line of 550 to 650 ohms impedance with zero resistance. The oscillator is crystal controlled. Included in this manual are descriptions of the component parts and their operation; instructions for installation, operation, and maintenance; parts list; numerous photographs; and tuning curves.

PB 17711. RADIO CORPORATION OF AMERICA. RCA-VICTOR DIVISION. Instruction book for Navy model TBK-14 radio telegraph transmitting equipment. (Instruction Book-38186) Apr 1942. 164 p. Price: Microfilm-$2.00 - Photostat-$11.00

The equipment consists essentially of a radio-transmitter unit, a motor-generator unit, and a motor starter unit. This radio transmitting equipment is designed for operation from various power-supply voltages: (a) 220/440 volt, 3 phase, 60 cycle supply; (b) 115 volt, d-c supply; (c) 230 volt, d-c supply. The radio transmitter unit is capable of operation on any frequency in the band of from 2000 to 18,100 Kc. The transmitter has a nominal power output of 500 watts. CW operation only is provided for; phone or MCW operation is not available. The instructions cover the installation, operation, and servicing of the equipment. Tables, photographs, graphs, diagrams, schematic diagrams, and commercial bulletins are attached.

PB 18083. RADIOMARINE CORPORATION OF AMERICA, NEW YORK, N. Y. Instruction book, model TCO-1, radiotelephone equipment. 1941. 21 p. Price: Microfilm-50¢ - Photostat-$2.00

This equipment comprises a compact, medium power radio telephone receiver and transmitter, designed primarily for marine service. Crystal control is employed in both the transmitter and receiver. This instruction book covers a description of the equipment, installation and operating data, a list of the component parts, and other essential information. The transmitter is designed to deliver 25 watts of carrier power. The frequency range is from 2000 to 3000 kc. There is provision for the use of 6 pre-tuned frequencies within this band. A remote control unit may be used. Photographs, schematics, and scale drawings of units are included. The equipment was manufactured for the Navy Department, Bureau of Ships.

PB 17468. RADIOMARINE CORPORATION OF AMERICA, NEW YORK, N. Y. Instruction book, Model TCP-2 transmitting - receiving radiotelephone equipment. Feb 1944. 85 p. Price: Microfilm-$1.00 - Photostat-$6.00

Subject equipment comprises a compact medium power radiotelephone transmitter and receiver, designed for installation aboard vessels of the United States Navy. The radio transmitter is designed to deliver 75 watts of carrier power into a typical 16 ohm, 200 mmfd. antenna. The modulation capability is substantially 100 percent. The transmitter and receiver are designed to cover the frequency range of 2000 to 3000 KC. There is provision for the use of a maximum of 10 frequencies within this band. The book contains sections covering general description, operating instructions, transmitter circuits, receiver circuits, installation, antenna and ground system, transmitter and receiver adjustments, maintenance, machine maintenance, winding data, vacuum tubes, coastal harbor stations and crystal list, and instructions for power conversion kit. Tables of parts list, spare parts, applicable color codes, list of manufacturers, graphs and drawings are included.

PB 17707. RADIOMARINE CORPORATION OF AMERICA, NEW YORK, N. Y. Instruction book, Model TDK radiotelegraph transmitting equipment. Jan 1943. 30 p. Price: Microfilm-50¢ - Photostat-$2.00

This instruction book covers the description, installation, adjustment, maintenance, and calibration of model TDK radiotelegraph transmitter and associated equipment. It operates either from the normal 110 volt DC shipboard supply or the 12 volt storage battery. The output frequency of the transmitter is continuously variable from 355 to 500 kc. Power output: 30 watts into an antenna of 750 micro-microfarads and 4 ohms. The total antenna circuit power developed is 50 watts. Tables, photographs and drawing appear at the end. The equipment was manufactured for the Navy Department, Bureau of Ships.

PB 17976. SCOTT, E. H., RADIO LABORATORIES, INC., CHICAGO, ILLINOIS. Instruction book for radio receiving equipment Model RBO-1. n.d. 58 p. Price: Microfilm-$1.00 - Photostat-$4.00

These instructions cover the installation, operation, and servicing of this equipment suitable for use aboard Naval vessels or at shore stations. It covers the frequency range of 0.53 to 1.60 and 5.55 to 15.60 mc in three frequency bands and is designed to provide optimum performance and high quality reception of voice or tone modulated radio frequency signals, on all frequency bands, by head telephone or loud speaker methods. Parts lists, photographs, curves and shcematic diagram are included. This equipment was manufactured for the Bureau of Ships, Navy Department.

PB 17453. SOUNDSCRIBER CORPORATION, NEW HAVEN, CONN. Instructions for model PH sound reproducing equipment. Oct 1942. 44 p. Price: Microfilm-50¢ - Photostat-$3.00

The model PH equipment is a complete sound reproducing equipment for voice or other audio signals, at variable speeds, from discs recorded on constant angular velocity recording equipment. It is suitable for reproducing CW or voice signals. Head phones, or built-in loud speaker, may be used for listening. The equipment is designed to operate from a 115 volt, 60 cycle, single phase, alternating current power source. The amplifier is a high gain amplifier employing 5 tubes. The reproducing head is connected to the input circuit and the speaker to the output circuit of the amplifier. Inserting the plug of the headphones automatically disconnects the loud speaker. The model PH equipment is equippped with a variable speed driving motor, a turntable operating at a variable speed, a reproducing arm, a log indicator, a setback mechanism, and a turntable brake mechanism. The following data are found in the instructions: Tube complement, installation, construction, circuit description, operating instructions, performance data, service and maintenance, test data, and parts list. A schematic diagram is included. The equipment was made for the Navy Department, Bureau of Ships.

PB 18009. STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY, ROCHESTER, N. Y. Preliminary instruction book for models RBM, RBM-1, RBM-2, and RBM-3 semi-portable radio receiving equipments. Jun 1942. 189 p. Price: Microfilm-$2.00 - Photostat-$13.00

This instruction book covers the installation, operation, and servicing of the semi-portable radio receiving equipments named above. Each component circuit is described in detail. Photographs, drawings and circuit, wiring and schematic diagrams are included. The following data describes the equipment: frequency range; MF 200 to 2000 kcs., HF 2 to 20 mcs. types of reception; CW, MCW, and voice.

PB 18108. U. S. NAVY DEPARTMENT. Navy transmitter equipment, 2 KW, Type TAQ-3. Miscellaneous diagrams. n.d. 14 p. Price: Microfilm-50¢ - Photostat-$1.00

Fourteen diagrams of Navy transmitter equipment, 2 KW, Type TAQ-3 include: assembly of motor generator set, schematic and connection wiring diagrams, and field wiring data for generator and motor. Bill of material and assembly, and magnetic controller.

PB 17449. U. S. NAVY DEPARTMENT. BUREAU OF ENGINEERING. Instructions for radio receiving equipment model RAS-1 (Manufactured by National Company, Inc., Malden, Mass.) Dec 1939. 85 p. Price: Microfilm-$1.00 - Photostat-$6.00

This instruction book covers installation, operation, and maintenance of model RAS-1 radio receiving equipment. This receiver is a 9 tube, rack mounted superheterodyne covering a continuous frequency range of from 190 to 30,000 kilocycles. The equipments are suitable for the reception of radio telephone or telegraph signals (either CW or MCW) by either headphone or loud speaker methods. The equipments are suitable for operation from 110/120 volts A.C., either 50/60 cycle or 25 cycle, as may be designated on the name plate of the power unit. Each complete equipment consists of radio receiver, power unit, loud speaker, coil system container, and mounting rack. The book contains drawings, photographs, graphs, curves, wiring diagrams, and a spare parts list.

PB 19959. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Advance base teletype installation and maintenance practices. (NAVSHIPS 900,031). Jul 1944. 72 p. Price: Microfilm-$1.00 - Photostat-$5.00
This manual describes teletype equipment and its installation, operation, and maintenance in forward areas. Photographs, schematic and circuit diagrams are included.

PB 18008. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Instruction book for Navy model RBF, RBF-1, and RBF-2 radio receiving equipment. (NAVSHIPS 900,229-1.B.) Jan 1943. 10 p. Price: Microfilm-50¢ - Photostat-$1.00
The instructions cover the description, operation and maintenance of an improved super-regenerative receiver. Photographs, schematic diagram and calibration curves are included. Frequency range: 27 to 280 mc. Supply: 115-125 volts, 50-60 cycles, single phase. National Company, Inc., Malden, Mass., is the manufacturer.

PB 18011. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Instruction book for radio receiving equipments Navy models RAK-7/RAL-7. (NAVSHIPS 900,480; RCA Instruction Books 38261/38262) Mar 1945. 211 p. Price: Microfilm-$2.50 - Photostat-15.00
These instructions cover the installation, operation, and servicing of the receiving equipments named above. These are designed for a-c operation, being equipped with power units for supplying all operating voltages required from an a-c source of 110, 115, or 120 volts, 60 cycles. The RAK-7 equipment covers the frequency range of 15 - 600 kc, and the RAL-7 covers the frequency range of 0.3 - 23.0 megacycles. Each is designed for the optimum performance for the reception of pure, modulated or interrupted CW damped radio telegraph signals, or voice-modulated CW. The output circuit is designed for use with one pair of 600-ohm phones. The RAL-7 series is designed for independent operation but may also be used in conjunction with an RAK-7 series, forming a complete two-channel equipment for guarding two frequencies simultaneously by one operator. A separate control unit may be used for this installation which is described in a subsequent section of this instruction book. Photographs, graphs, tables, diagrams and schematic diagrams are included. The equipment was manufactured by Andrea Radio Corporation for RCA Victor Division, Radio Corporation of America.

PB 17451. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Instruction book for teletypewriter repeater Navy model PM for use with carrier control system model UN. (NAVSHIPS 900,315) Feb 1945. 121 p. Price: Microfilm-$1.50-Photostat-$9.00
The general purpose of this repeater is to provide the necessary equipment and interconnections so that teletypewriters may be used for sending and receiving on the telegraph circuits of the UN carrier control system. This instruction book is divided into 7 sections as follows: General description, detailed description, installation, tests and adjustments, operation, maintenance, parts and spare parts. There are 53 photographs, outlines, drawings, diagrams, and schematic diagrams attached to the text. Western Electric Company, Inc., is the manufacturer.

PB 18038. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Preliminary instruction book for four-wire terminating equipment for use with carrier control systems, Navy model UN. (Manufactured by Western Electric Company, Inc., New York, N. Y.) n. d. 90. Price: Microfilm-$1.00 - Photostat-$6.00
The purpose of the Navy model on terminating 1,000-cycle signaling equipment is to provide a means of interconnecting the four-wire carrier telephone channels of the carrier telegraph to two-wire telephone plant facilities and to arrange for telephone signaling over these channels. This equipment is mounted in a steel cabinet and consists of the following units: four-wire terminating unit, ringer oscillator, 20-cycle applique unit, signalling power-supply unit, and static ringing generator. It is connected with a telephone switchboard to provide the equivalent of long distance telephone lines. The instruction book describes the equipment and provides full information on its operation, installation and maintenance. Parts lists are included. The book contains labeled photographs, wiring diagrams and schematics.

PB 17969. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Preliminary instruction book for Navy Model RBH-3 radio receiving equipment (manufactured by National Co., Inc., Malden, Mass.); and Addenda, dated 21 Jul 1944. (Navships 900,412-IB and Addenda) Jun 1943. 89 p. Price: Microfilm-$1.00 - Photostat-$4.00
This equipment manufactured for the Navy Department, Bureau of Ships, is suitable for the reception of radio telephone and telegraph signals (either CW or MCW) by either headphone or loud speaker methods. It may be used where radiation from the high frequency oscillator, located within the radio receiver, is less than 400 micro-micro-watts as measured at the radio frequency input terminals. It is a superheterodyne model covering a continuous frequency range of from 300-1200 kcs. and 1700-16,000 kcs. in five bands. The manual gives information on the power requirements, antenna, controls, CW reception and tube complement as well as instructions for installation, operation and maintenance of the set and its component parts. A schematic diagram, parts list, and outline drawings illustrate the text.

PB 18052. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Preliminary instruction book for Navy model TAQ-9 radio telegraph transmitting equipment. (Manufactured by General Electric Company, Schenectady, N. Y.). (GEI 14825) Apr 1941. 238 p. Price: Microfilm-$2.50 - Photostat-$16.00
The model TAQ-9 radio telegraph transmitting equipment provides CW or MCW telegraphic operation at any keying speed up to 100 words per minute at all frequencies within the range 175 - 600 kc. The modulated signal is obtained by means of a suitable vacuum tube audio-frequency oscillator circuit designed to modulate the radio-frequency output of the transmitter at a frequency of approximately 800 cycles per second. Nominal power output is two kilowatts. This manual gives instructions on the installation, operation, maintenance and adjustment of the component parts. Parts lists, curves, schematic and wiring diagrams supplement text.

PB 18043. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Preliminary instruction book for Navy models TDM-2, TDM-3, and TDM-4 radio transmitting equipments. (Manufactured by Federal Telephone and Radio Corporation, Newark, N. J.) Mar 1944. 425 p. Price: Microfilm-$4.50 - Photostat-$29.00
Navy models TDM-2 and TDM-3 radio transmitting equipments are complete multi-channel radio-telegraph stations and model TDM-4 is a complete multi-channel radio telegraph and/or telephone station for operation within a frequency range from 2.0 to 20.0 megacycles. The stations can be controlled at the transmitter location or from a remote point 20 miles or more away. Each station is composed of two independent banks of units which, in conjunction with associated equipment, are capable of operation as complete transmitters, either simultaneously or independently. Units of equipment are discussed with regard to installation, adjustments, toning, operation and maintenance. Parts lists, tables of equipment data, schematics, wiring diagrams, graphs and photographs are included.

PB 21903. U. S. WAR DEPARTMENT. Diversity receiving combining equipment. (Tech Manual 11-2515). Sep 1944. 37 p. Price: Microfilm-50¢ - Photostat-$3.00
The diversity receiving equipment described in this manual provides a means for combining the outputs from three receivers to produce a single keyed audio output signal, free from noise and other undesired interference. It is suitable for use only in receiving CW or MCW signals, and cannot be used for voice. The manual contains a description, operating and maintenance instructions, and supplementary data. Photographs and diagrams are included.

PB 21917. U. S. WAR DEPARTMENT. Diversity receiving equipments AN/FRR-3 and AN/FRR-3A. (Tech Manual 11-872). Jan 1946. 150 p. Price: Microfilm-$1.50 - Photostat-$10.00
These equipments are fixed plant sets designed for use in a point-to-point radio-teletype system of communication to overcome the effects of fading. The equipments use two identical superheterodyne receivers, operated from separate antennas. A common high-frequency oscillator is used to feed both receivers. For diversity operation automatic-volume-control voltage can be made common to both receivers. The output of the receivers is fed to radioteletype terminal equipment AN/FGC-1. The receivers cover a frequency range from 2.4 to 23.0 mc in 5 bands, and receive a-m and radioteletype signals. This manual covers installation, operation, maintenance, and repair. Functional, schematic, and circuit diagrams, photographs, and sketches are included.

PB 21897. U. S. WAR DEPARTMENT. Radio control central AN/TRQ-1 ( ). (Tech Manual 11-2619). Jul 1944. 44 p. Price: Microfilm-50¢ - Photostat-$3.00
Radio control central AN/TRQ-1( ) is a four-position, radio-control-intercept station, installed in a shelter, both of which are usually mounted on a 2½ ton cargo truck. The main power source for the equipment is a power unit installed on a trailer. The control central has four operating positions, each position having provision for wire communication with, and remote control of, a radio transmitting station. Three of the operating positions have as required equipment, two monitoring receivers, a remote-control coupling unit, a typewriter, and a telegraph key. The fourth has two receivers affording more extended high-frequency coverage, a twelve-position telephone switchboard, a remote-control coupling unit, a typewriter, a key, a receiver-transmitter for communication with other control centers, and a frequency meter for general utility use in all four positions. Positions 1, 2, and 4 monitor. The frequency bands from 150 to 18,000 kc, while position 3 monitors the frequency ranges from 1.25 to 143 mc. The component parts are described, installation, operating, and maintenance instructions are given, and there are photographs and diagrams.

PB 22344. U. S. WAR DEPARTMENT. Radio sets SCR-399-A and SCR-499-A. (Tech Manual 11-281) Mar 1945. 240 p. Price: Microfilm-$2.50 - Photostat-$16.00
These sets are essentially the same, but the SCR-399-A is usually installed as a mobile station in a truck-mounted shelter and trailer, while the SCR-499-A is ordinarily set up as a fixed station. The transmitters will provide voice or CW communication over a range of more than 100 miles. The frequency range is from 2 to 18 mc and the power output is 400 watts for CW and 300 watts for voice. The receivers have a superheterodyne circuit, can receive CW, tone, and voice signals and have a range from 1.5 to 18 mc in 6 bands. This manual contains sections on description, installation, operation, preventive maintenance, auxiliary equipment, repair instructions, and parts list. There are photographs, drawings, and diagrams.

PB 22352. U. S. WAR DEPARTMENT. Repeater set TC-18; terminal, telegraph. (Tech Manual 11-2004) Jun 1945. 76 p. Price: Microfilm-$1.00 - Photostat-$6.00
This is a portable d-c telegraph repeater set consisting of two ground rods and a d-c telegraph terminal repeater designed for transmitting to and receiving from another repeater, or its equivalent, at a distant terminal on a half-duplex basis, either with or without an intermediate repeater at one intermediate point. It is designed for operation on field-wire line circuits (simplexed), spiral-four cable circuits (simplexed), and open wire circuits (compositied) with ground return. It is arranged for local operation with a teletypewriter or manual telegraph set. This handbook gives operating, maintenance, and repair instructions and contains photographs and diagrams.

PB 22353. U. S. WAR DEPARTMENT. Ringers, TA-38/FC and TA-39/FC; voice-frequency ringer packaged equipment. (Tech Manual 11-2021) May 1945. 100 p. Price: Microfilm-$1.00 - Photostat-$7.00
These ringers are designed for fixed plant use with other items of packaged equipment. Each equipment is used to provide signalling over voice channels and telephone lines which will not transmit low-frequency ringing currents sent from switchboards or magneto telephone sets. It will provide ringing facilities for voice circuits derived from a carrier system, or from lines equipped with telephone repeaters, composite telegraph sets, or both. One ringing circuit is required at each end of the telephone circuit. This method of signalling is known as 1000/20-cycle or voice-frequency ringing. Operating, maintenance and repair instructions are given in this manual, which is illustrated with photographs and diagrams.

PB 21900. U. S. WAR DEPARTMENT. Speech reproducer MC-503. (Tech Manual 11-2543). Nov 1944. 120 p. Price: Microfilm-$1.50 - Photostat-$8.00
Speech reproducer MC-503 is a variable-speed, portable, reproducing machine, designed for mobile operation. The equipment, manufactured by the Dictaphone Corporation, makes speech and code recordings on record cylinders and reproduces them so that they are audible through headphones or a loudspeaker. This manual contains description of component parts, installation, operation, and maintenance instructions, and supplementary data. There are numerous illustrations, including photographs, schematics, and assembly drawings.

PB 21147. U. S. WAR DEPARTMENT. SIGNAL CORPS. International Morse code: Instructions. (Tech Manual 11-459) Aug 1945. 74 p. Available from the Supt of Docs., Washington 25, D. C. Price: 25¢
This manual presents the methods used to teach students the skill of sending and receiving International Morse Code, and is addressed to both students and instructors. The first four sections deal with basic code learning methods, the code language and handling of the key. Sections V through IX are addressed to code instructors and include a detailed discussion of the accepted code teaching methods, sample lesson plans, typical instruction schedules and information to assist the instructor in evaluating his student's progress. Included also are instructions in the use of the typewriter and the tape perforator; a diagram of the semiautomatic key and instructions for its use; lists of prosigns, their International Morse character sounds and meanings; and practice exercises.

PB 21974. U. S. WAR DEPARTMENT. SIGNAL CORPS. Reel assembly RL-106/VI. (Tech Manual 11-2284). Jun 1944. 17 p. Price: Microfilm-50¢ - Photostat-$2.00
The reel assembly described in this manual is a gun motor carriage interphone extension system designed to provide a means of communication between an observer a short distance from the gun motor carriage and those within the gun motor carriage. Instructions are given for installations, operation and maintenance of the equipment. Photographs illustrate the text.

PB 21155. U. S. WAR DEPARTMENT. SIGNAL CORPS. Sound recording set AN/UEQ-1. (Tech Manual 11-2522) Sep 1944. 93 p. Available from Supt. Documents, Washington 25, D.C. Price: 25¢
The sound recording set described in this manual is a completely self contained portable recording and instantaneous playback set which has additional facilities for use as a public address system. The functioning of parts is described and instructions are included for the maintenance of the equipment. Photographs and diagrams illustrate the text.

PB 21964. U. S. WAR DEPARTMENT. SIGNAL CORPS. Speech-phase sound detector, model SCR. (Tech Manual 11-2641) Sep 1944. 22 p. Price: Microfilm-50¢ - Photostat-$2.00
This equipment is a portable battery-operated, three stage audio amplifier which enables the operator to monitor conversations without the knowledge of those speaking. A description of the use of the equipment is followed by instructions for its installation under varying conditions, and for its operation and maintenance. Photographs, diagrams, tables, and a parts list are included.

PB 21142. U. S. WAR DEPARTMENT. SIGNAL CORPS. Telegraph printer sets (teletypewriter) ER-97 and ER-98; teletypewriter sets ER-97-A, ER-98-A, and ER-102. (Tech Manual 11-354) Mar 1944. 37 p. Available from the Supt. of Docs., Washington 25, D. C. Price: 15¢
This manual describes five different portable teletypewriters which provide complete sending and receiving stations. The differences between these units are indicated but component parts for all sets are given and all parts are described. Instructions are given for installation, operation and maintenance. Power sources and connections are discussed. There are photographs and schematic wiring diagrams.

PB 21951. U. S. WAR DEPARTMENT. SIGNAL CORPS. Telegraph switchboard SB-6/GG. (Tech Manual 11-2035). Aug 1944. 19 p. Price: Microfilm-50¢ - Photostat-$2.00
This switchboard is a jack patching switchboard used for interconnecting local d-c lines, loops or extensions, and teletypewriter sets or equipments. It is used in case of failure of either the circuits or the equipment, or when it is desired to rearrange the circuit or equipment layout. It consists of a 4-line circuit jack cabinet for mounting on the wall. Instructions are given for the installation, operation and maintenance of the equipment. Photographs, circuit and connection diagrams and a parts list are included.

PB 15087. WESTERN ELECTRIC COMPANY, CHICAGO. Instruction book for model GF-12 and model RU-17 aircraft radio telegraph and telephone transmitting and receiving equipments. (U. S. Navy Dept NavAer 08-5Q-101). Apr 1941. 85 p. Price: Microfilm-$1.00 - Photostat-$6.00

PB 18103. WESTERN ELECTRIC COMPANY. Model UB-1 remote control equipment. Instruction book. Dec 1940. 78 p. Price: Microfilm-$1.00 - Photostat-$6.00
This equipment consists of a radio transmitter (CW-52035), a rectifier power unit (CW-20112), and a radio receiver, the instructions for the latter being given in a separate book. The transmitter and rectifier power unit were designed to be used as part of a voice frequency telegraph system using five channels which may be keyed simultaneously. The equipment operates from a 210 to 250-volt, 60 cycle, single-phase, alternating current. The transmitter may be adjusted to operate at any frequency between 27 and 40 megacycles and has an output of 500 watts. Carrier frequency is maintained to better than .01 per cent by means of a Western Electric quartz crystal. Complete modulation of the carrier power may be obtained with approximately 7 per cent distortion at 1000 cycles. Included are descriptions of the equipment and circuits, instructions for installation, tuning procedure and maintenance, photographs, schematic diagrams, drawings and wiring diagrams.

Electronics

German

PB 15004. GOCKEL, HEINRICH. Die Dämpfung von piezokristallen unter besonderer berucksichtigung der kristallographischen eigenschaften. (The damping of piezoelectric crystals with special reference to crystallographic properties). Inaug. Dissertation, Univ. of Göttingen. (Supplementary material to PB-14620: Notes on interviews with German scientists on synthetic crystals in August and September, 1945). 1936. 14 p. Price: Microfilm-50¢ - Photostat-$1.00
The piezo electric moduli for aspergin and urotropin crystals were measured. The values obtained were nigh compared with quartz. A method is developed for measuring the damping decrement of the oscillating piezo electric crystal without the errors resulting from coupled oscillation circuits.

PB 18901. HUNT, G. L. Telefunken metal/ceramic radio valves. (BIOS Final Rept 30, Item 1). Aug 1945. 34 p. Price: Microfilm-50¢ - Photostat-$3.00
A range of metal/ceramic tubes was developed by Telefunken in Germany for use at decimeter wavelengths. The tubes bear some resemblance to the American "Lighthouse" tubes and are designed for use in concentric line circuits. No glass is used in their construction; instead a special ceramic has been developed which is claimed to be vacuum tight provided the wall thickness exceeds 3 mm. The anode cooling block is of aluminum and is screwed on to a stud projecting from the copper anode. The seals between the ceramic and metal portions of the valve are soldered. The information was obtained from interrogation of Dr. Kleen, of Telefunken, at Hamburg, and Dr. Weth and Dr. E. Wiegand, at the Ceram valve factory in Berlin, and includes details of construction of the tubes, manufacture of the ceramic parts, preparation of metal parts for metal/ceramic bonding, and soldering. The appendices give information regarding the preparation of the "Ceto" getter and the rating and application of valves in the metal/ceramic range. Drawings.

PB 18153. KONGSTEAD, L. P. Technical inspection of Robert Bosch Dispersal Point, Schwäbische Textil Werke, Ebersbach. (AAF Tech Intelligence Rept F-27). Jun 19, 1945. 2 p. Price: Microfilm-50¢ - Photostat-$1.00
This plant made all of the condensers for Robert Bosch equipment of all kinds. This included high capacitance condensers for a great variety of radio filters. These condenser windings are of unusual interest because they are wound with paper strips on which zinc has been deposited by condensation. This gives a very compact condenser, suitable for high frequency circuits, since the conductive film of zinc, being extremely thin, takes up practically no room. Kraft paper from .0003" to .0005" in one side with a thin film of nitrocellulose lacquer and heated for ten hours at 105°C. prior to the zinc depositing operation. A roll of the paper is placed on a mandrel within a vacuum chamber and the paper passed directly over a crucible containing melted zinc maintained at a temperature of 600°C. The zinc vapor is condensed on the cool lacquer surface of the paper to such a degree that electrical continuity is obtained. Due to the thinness of the zinc coating, these condensers are not suitable for ignition use. Other information regarding these condensers is given in this report.

PB 16859. LINDAR, L. and SCHNIEDERMANN, J. The effect of self-inductance of rolled paper condensers on their impedance. (AAF Air Tech Service Command. T - 2 Translation 410). n.d. 20 p. Price: Microfilm-50¢ - Photostat-$1.00
Report from the Central Laboratory of Siemens and Halske Company. Calculations make a subdivision between the self induction of the roll itself, of the foil tabs, of the inner wiring, and of the outside leads. Current paths in each of these elements is considered separately, and inductance calculated, thus giving a clear equivalent circuit diagram for the complete condenser. Eleven figures of condensers and a bibliography of 8 items are included.

PB 18134. MATOSSI. Resume of work being done by Dr. Matossi at the Physics Laboratories, Badgastein, Germany. (AAF Tech Intelligence Rept E-24). Jun 1945. 2 p. Price: Microfilm-50¢ - Photostat-$1.00
This report is a brief resume of research work in the field of spectrographic investigations in the infra-red spectrum from 2m to 20m, and optical investigations in general. Projects under investigation included (1) Pyroelectrical effect used for radiation measurement (2) Infra-red absorption of water vapor. (3) Raman effect of alkali halides (4) Raman effect in group theoretical treatment (5) Infra-red absorption and reflection of materials important in high-frequency techniques. Future projects are (1) Dependence of refractive index on temperature (2) electronic optics.

PB 18929. STARR, A. T. and others. German betatrons. (BIOS Final Rept 148, Item 1). Jan 1946. 15 p. Price: Microfilm-50¢ - Photostat-$1.00
This report summarizes visits to six German targets for information on the design and construction of betatrons. Drawings and several working models were seen and interviews were held with several specialists in the field. At Megavolt

Forschungs-Laboratorium a 15 MV betatron was seen in working condition but the output was low because of excessive conductivity of the silvering of the doughnut. Betatrons were also seen at Siemens-Reiniger Werke. One of them is completed and yields X-rays at 6 MV. The main features of the apparatus are the doughnut which is made of two porcelain halves and the elaborate system of internal injection. Drawings and documents were collected, which are on file in London at the Central Radio Bureau.

PB 9269. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Abdichtung von bewegten, stromführenden geräteteilen. (Sealing of movable conducting parts). German patent application T57240 VIIIb/21c Apr 17, 1942 still pending. Original inventor: Schlya. 1942. 5 p. Price: Microfilm-50¢ - Photostat-$1.00
Illustrated.

PB 9254. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Detektoranordnung für ultrakurze wellen. (Detector arrangement for ultrashort waves) German patent application Jan. 19, 1945. Telefunken No. 8894. Patent pending. Original inventors: Lennartz and Batz, 1945. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
Illustrations missing.

PB 9253. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Endverschluss und anschlussstück für dezimeter-hochfrequenskabel. (Plug and cable connector for microwaves). German patent application Jan. 19, 1945 and still pending. Telefunken No. 8893. Original inventor: Belling, 1945. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
Illustration missing.

PB 9264. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Halterung für leitungen, wie schläuche, kabel u. dgl. (A holder for cables and tubular transmission lines, etc.). German patent application T57205 VIIIb/21c Apr 8, 1942 still pending. Original inventors: Pieroth, Schmidt. 1942. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
Illustrated.

PB 9255. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Lagerung, insbesondere für die welle von drehkondensatoren. (A bearing, esp. for the shaft of a variable condenser) German patent application Jan 19, 1945 Telefunken No. 8895. Original inventor: Paschke. 1945. 2 p. Price: Microfilm-50¢ - Photostat-$1.00
Illustration missing.

PB 9263. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Richtantenne für sehr kurze elektrische wellen. (Directive antenna for very short waves). German patent application T57204 VIIIa/21a4 Apr 8, 1942. Still pending. Original inventor: Dr. Gerhard. 1942. 7 p. Price: Microfilm-50¢ - Photostat-$1.00
Illustrated.

PB 9276. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M. B. H., BERLIN. Schaltungsanordnung für kathodenstrahlröhren mit quer abgelenktem elektronenstrahl (An arrangement for cathode-ray tubes with transverse deflected electron beam). German patent application T57303 VIIId/21c Apr 25, 1942, rejected. Original inventor: Hasel. 1942. 9 p. Price: Microfilm-50¢ - Photostat-$1.00
Illustrated.

PB 9279. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Verfahren zum abgleich der frequenz von runden piezoelektrischen kristallen. (A procedure to equalize the frequency of round piezoelectric crystals). German patent application T57304 VIIIa/21a4 Apr 8, 1942 still pending. Original inventor: Mueller. 1942. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
Illustrated.

PB 9271. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Verfahren zum ausheizen von elektrodensystemen von entladungsrohren durch elektronenbombardement. (Procedure to furnish heat to the electrodes of discharge tubes by electron bombardment) German patent application T57251 VIIIc /21g Apr 20, 1942 still pending. Original inventor: Dr. Mueller. 1942. 6 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 9274. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Verfahren zur herstellung einer nicht als glühkathode dienenden elektrode. (A procedure for the manufacturing of an electrode not serving as a cathode). German patent application T57266 VIIIc/21g Apr 23, 1942 still pending. Original inventor: Dr. Wagener. 1942. 5 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 9262. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Verfahren zur ueberwachung des betriebszustandes von magnetfeldröhren. (A procedure for testing vacuum tubes using magnetic fields). German patent No. 762552 applied for Apr 2, 1942 with No. T57181 VIIIa/21a4. Original inventor: Dr. Lerbs. 1942. 5 p. Price: Microfilm-50¢ - Photostat-$1.00
Not illustrated.

PB 9261. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Verstärkerstufe mit phasenreiner steilheit. (Amplifier stage with non-reactive conductance) German patent application T57180 VIIIa/21a4 Apr 2, 1942. Patent pending. Original inventor: Dr. Kleen. 1942. 8 p. Price: Microfilm-50¢ - Photostat-$1.00
Illustrated.

PB 19732. U. S. THIRD ARMY. SIGNAL SECTION. German direction finder, MP2a, manufactured 1940. (Enemy Equipment Intelligence Service Rept 8-5). Aug 1944. 8 p. Price: Microfilm-50¢ - Photostat-$1.00
This set when found was without the antennas. It is almost identical in design to German D/F Receiver L.Mw./24b-315. The circuit is identical except for the addition of a switch used to disconnect the loop antennas so the set uses only the sense antenna for signal pickup. A circuit diagram and 8 photographs are included.

PB 19736. U. S. THIRD ARMY. SIGNAL SECTION. German high frequency communication jamming apparatus. (Enemy Equipment Intelligence Service Rept 8-31). May 1945. 8 p. Price: Microfilm-50¢ - Photostat-$1.00
This equipment was picked up in a railroad car near Wabern, Germany. The frequency coverage, 53-116 mc/s, indicates its use to jam aircraft equipment. The plate power input to the transmitter is approximately 500 watts. The large framework mounts the modulator, power supplies, voltage regulator, blower, and power switches. The frame on top contains the transmitter unit. Description of the units is given for (a) power supplies, (b) line voltage regulator, (c) pulse modulator, (d) tone modulator, (e) power control panel, (f) transmitter, and (g) antenna. Photographs and operating instructions are attached.

PB 19731. U. S. THIRD ARMY. SIGNAL SECTION. German mine detector, MS-Frankfurt 42, manufactured 1942. (Enemy Equipment Intelligence Service Rept 8-4). Aug 1944. 7 p. Price: Microfilm-50¢ - Photostat-$1.00
This is a portable detector for metallic mines, weighing about 20 pounds, and designed to be carried on the operator's back. The circuit is a conventional push-pull audio oscillator operating on a frequency of approximately 800 cps. The oscillator output works into a balanced coil arrangement at the end of the detector arm. Any metal object coming in close proximity with either coil changes the balance of the circuit and causes the tone in the headset to increase appreciably. A circuit diagram, 6 photographs and operating instructions are included.

PB 19735. U. S. THIRD ARMY. SIGNAL SECTION. Report on search coil for (Ka. Spu. Verst.). (Enemy Equipment Intelligence Service Rept 8-30 Supp.). Jul 1945. 1 p. Price: Microfilm-50¢ - Photostat-$1.00
This report supplements report no. EEIS-8-30. It describes search coil for a captured German cable tracing amplifier. It consists of a plastic circular disc with a rectangular metal core exposed on the bottom. An extension cord connects the search coil to the amplifier. Inside the disc is a pancake-wound coil tuned to 800 cycles by a fixed capacitor connected across it. Signals induced into this coil from the cable are fed to the input of the amplifier unit. A photograph is included.

PB 15541. U. S. WAR DEPARTMENT. CORPS OF ENGINEERS. ENGINEER BOARD. Letter report, German mine detector, Lowedel Gerat, EB Reg 2850. Jun 1945. 9 p. Price: Microfilm-50¢ - Photostat-$1.00
This captured equipment is used to detect ferrous and nonferrous metallic anti-personnel and anti-tank mines. Preliminary studies were made of the physical characteristics, principles of operation, and power supply of the detector. It operates on the principle of a four-arm inductance bridge using a single search coil system and is powered by batteries. The detector appears to be less effective than American equipment. It has a high fatigue factor produced by the weight of the detector and low sensitivity. Attached are photographs, circuit diagrams and operating instructions.

Italian

PB 19757. ALLIED FORCE HEADQUARTERS. SIGNAL SECTION. 849TH SIGNAL INTELLIGENCE SERVICE. Italian mine detector. Oct 1943. 10 p. Price: Microfilm-50¢ - Photostat-$1.00
The Italian mine detector, manufactured by Oliveri and Glisenti, Turin, is a radio frequency device. Its operation is based on two electrical principles: the variation of the inductance of a coil when a conductor is moved in its field; and the production of a beat frequency when two signal voltages of different frequencies are mixed in a detector. The complete set consists of a sweeper, a metal pack case, and a canvas carrying sack for the sweeper poles only. Circuit analysis is given in detail. The set is apparently of old design, but compares favorably with American equipment. Photographs, a parts list, and a circuit diagram are included.

United States

PB 20262. ARNOT, E. G. F. Development of series spark gaps: Final report May 15, 1942 to June 30, 1945. (NDRC 14:494). Jul 1945. 35 p. Price: Microfilm-50¢ - Photostat-$3.00
The purpose of this contract with the Lamp Division Westinghouse Electric Corporation was to develop a high voltage switch for use in line type radar modulators above 0.5 megawatts peak power. This report covers the work done from July 1, 1944 to June 30, 1945, and summarizes previous research. The principle developments were: (1) Getting the WL-3240 tube into production; (2) reducing the fall in the maximum operating voltage which occurs at high powers; (3) life tests of the improved design with double triggering and voltage balancing in 3 gap circuits; and (4) an investigation of arc drop and gap dissipation. The report also contains references, tables of specifications and test results, diagrams, and photographs.

PB 20260. ARNOT, EDWARD G. F. Development of series spark gaps, Jan 1, 1943 to Jun 30, 1944. (NDRC Rept 14: 327). Aug 1944. 47 p. Price: Microfilm-50¢ - Photostat-$4.00
This report outlines the work done on the development of gas filled series gap tubes for radar modulators at the Research Department, Westinghouse Lamp Division during the period cited. Two mechanical designs reached the production stage, the WL-3226, filled to 80 CWS pressure and used in a 300 KW modulator, and the WL-3240, which appears satisfactory for a one megawatt application. Further studies are being carried on. For a final report on this program, see PB 20262. The report is illustrated by curves and photographs.

PB 16619. BADESSA, R. S. A guide for choosing mixer frequencies. n.d. 15 p. Price: Microfilm-50¢ - Photostat-$1.00
The purpose of this analysis as stated by the author, a member of the Radio Countermeasures Section of the Naval Research Laboratory, is to show how the nature of unwanted components may be determined conveniently by means of a chart. The two mixer interference charts accompanying this analysis were prepared to reduce the number of computations required when analyzing a given choice of mixer frequencies. The charts serve to indicate the order of unwanted components possible for a given combination of mixer frequencies.

PB 15291. BARKER, C. B. and RIBLET, H. J. Streamlined microwave omni-directional antennas. (MIT Radiation Lab Rept 871). Jan 1945. 13 p. Price: Microfilm-50¢ - Photostat-$1.00
High speed aircraft require antennas which are inherently streamlined. Details are given of antennas for both horizontal and vertical polarization at S-band. For horizontal polarization a pair of slots on the flat faces of a streamlined section give excellent results when fed by a slotted dipole. For vertical polarization a pair of vertical dipoles may be used. The designs are such as to provide satisfactory azimuth and elevation patterns with tolerable match. Drawings and curves illustrate the text.

PB 19657. BARTIK, W. J. and others. Investigations of the measurement of noise: Final report. (OSRD Rept 6356). Oct 1945. 32 p. Price: Microfilm-50¢ - Photostat-$3.00
OSRD contracted with the Moore School of Electrical Engineering, University of Pennsylvania "to conduct miscellaneous studies and investigations involving radio interference phenomena including development of standards for measurements and measurement techniques, comparison of various types of noise meters and construction of a standard noise meter." This is the final report under this contract, although further studies are proceeding under a new contract with the Navy Bureau of Ships. This report covers an analysis of present noise meters and determination of specifications of noise meter performance. There are four appendices: (A) Antennas for noise meters; (B) Frequency conversion; (C) Detection of electrical noise; and (D) Calibration of the noise meter. Bibliography is included.

PB 18355. BETHE, H. A. and others. Theory of the T-R box. (NDRC Rept 14-128) May 1943. 35 p. Price: Microfilm-50¢ - Photostat-$3.00
The theory of the performance of a TR box is developed. In part A, the low level operation of the TR box is considered. The resonant frequency is calculated for a box with cylindrical center post, as a function of the physical dimensions. The calculation is done with the help of the integral equation method. Various quantities are deduced from the formula for the resonant frequency, such as the total energy stored in the cavity, the shunt resistance, the effect of glass and of coupling windows or loops. In part B, the high level performance is discussed. Special consideration is given to the direct coupling. The normal mode coupling and its interference with direct coupling is treated. (See also PB 18356).

PB 15284. BOTHWELL, F. E. The effect of small changes in circuit parameters on the solution of network problems. (MIT Radiation Lab Rept 1063) Jan 1946. 10 p. Price: Microfilm-50¢ - Photostat-$1.00
In many engineering problems it is necessary to find the effect on various network parameters. Resolving the problem for a large number of values of these parameters may be avoided by using the variation procedure described in this report. The procedure is applied to two specific problems, and the results are given in graphical form.

PB 18354. MOWERS, W. A. and others. Theory of thick inductive windows with small openings. (MDRC Rept 14:171) Nov 1943. 19 p. Price: Microfilm-50¢ - Photostat-$2.00
Formulae are developed in this report for the admittance and transmission coefficient of an inductive window of arbitrary thickness but small opening. Graphs are given of the real and imaginary part of the admittance as a function of the thickness.

PB 20252. CARNEGIE INSTITUTE OF TECHNOLOGY. Memoranda on the May 1943 meeting on dark-trace tubes at the Radiation Laboratory. (MDRC Rept 14:183). May 1943. 29 p. Price: Microfilm-50¢ - Photostat-$3.00
This report contains three memoranda on dark-trace tubes. The first is "Screen structure, contrast, thickness, and depth of electron penetration in DT tubes", by I. Katermann. Curves and ultra-microscope pictures illustrate the paper. Another is "Preliminary experiments on dark trace screens", by Robert J. Mourer, dealing with the mechanism by which a DT screen is discolored by an electron beam. This includes several graphs. The third memorandum is Frederick Seitz's "Notes on scattering and absorption by a translucent screen". It deals with a simple method of analyzing the way in which a translucent screen absorbs and scatters light.

PB 6242. CHEVALLEY, EDWARD A. and KESTER, ROBERT E. Inspection and test of remotely-controlled tuning equipment RC-197-T2, Serial Nos. 1 and 2, developed by Stoddart Aircraft Radio Company. Nov. 1, 1943. (WD ARL Engineering Rept No 352) 1943. 50 p. Price: Microfilm-50¢ - Photostat-$4.00
The purpose of this test was to determine the suitability of the remotely-controlled antenna tuning equipment RC-197-T2 for use with the Radio transmitter SCR-287 in Army aircraft and to determine whether or not the development specifications had been met. Equipment proved satisfactory on all frequencies. Certain improvements and refinements are recommended. Tables, photographs, and diagrams are included.

PB 16891. CHRISTENSON, CARL and MORGORDEN, OSCAR. A study of the coupling between two conductors in a common trunk at the intermediate frequencies. (Naval Research Lab Rept R-1746. BuShips Prob. R-1R) May 1941. 47 p. Price: Microfilm-50¢ - Photostat-$4.00
Tests were conducted by placing conductors of 5/16 inch copper tubing in a 30-foot long trunk of galvanized iron. Two dummy antennas were used to avoid antenna coupling. Frequencies used were from 175 to 600 kc. Coupling between conductors without a separating shield was found to be appreciable at these frequencies but its effect was important only for a band of frequencies approximately ± 5% wide near the resonance frequency of the coupled antenna system. The effect of coupling is eliminated by the interposition of a complete metallic shield or screen between the two leads. This report contains complete graphs of test results.

PB 14005. COBINE, J. D. Low-frequency noise spectrum of the 6D4 gas triode. (Harvard Univ Radio Research Lab Tech Memo 411-TM-115) May 1944. 6 p. Price: Microfilm-50¢ - Photostat-$1.00
Noise output of the Sylvania 6D4 miniature gas triode with a transverse magnetic field of 300 gauss is nearly constant at a level of 10 mv/KΩ from 25cps. to 100 Kc. Peak voltage of 6 volts is present due to the maximum noise output at about 1Mc. Noise output can be increased about 20db. by placing a capacitor of 0.0005 mfd. between cathode and anode. This noise should be suitable for both spot jamming and for communication jamming. Curves on spectrum of Sylvania 6D4 are included. Report is brief.

PB 17934. COMMUNICATION DEVELOPMENT CORPORATION, NEWARK, NEW JERSEY. Instruction book for model YA localizer beacon equipment. Jan 1939. 56 p. Price: Microfilm - $1.00 - Photostat - $4.00
Model YA equipment is a complete radio transmitter designed for use as an airport localizer and for traffic control on voice. It may be used to transmit either tone modulated or voice modulated signals in the band of 300 to 550 kc. It consists of four principal units: Transmitter; remote control unit; loop antenna coupler; and voice antenna tuning unit. In the voice position the carrier power is 10 to 20 watts, and in the beacon position 25 to 100 watts. Photographs and diagrams are included. The equipment was manufactured for the Navy Department, Bureau of Engineering.

PB 14041. CRAWFORD, F. H. Noise modulation of the ZP 594 at 1 KW output power. (Harvard Univ Radio Research Lab Tech Memo 411-TM-138A). Oct 1944. 5 p. Price: Microfilm-50¢ - Photostat-$1.00
This report is on a continuation of the experiments reported in PB 14040. Measurements on the modulated spectrum bandwidths of half-power points have been carried out on a ZP594 magnetron at output power from 500 to 1300 watts and a more restricted series on a ZP 597 at powers near 500 watts. Bandwidths of 6 to 12 mc have been obtained with the 594, and of 4.4 mc with the 597. Greatest bandwidths result at d-c currents around 0.5 amperes. Better specra result as the voltage is raised at a given constant input powsr. Test results are given in tabular form. A diagram of the method of modulation and a graph of the noise spectrum of the modulation are included.

PB 14040. CRAWFORD, F. H. Noise modulation of ZP507 magnetron at 150-watt output level. (Harvard Univ Radio Research Lab Tech Memo 411-TM-138). Aug 1944. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
Preliminary measurements have been carried out on the noise modulation of the ZP597 magnetron at low power levels and relatively narrow modulation bandwidth. These measurements were made on an experimental tube and are too tentative to warrant definite conclusions. The tube appears to be usable as a source of power for a jamming transmitter at a power level of the order of 150 watts for frequencies from 1170 to 1500 mc. Three diagrams are included. PB 4041 describes continued experiments on this tube at 1 kw output power.

PB 14022. DANIELL, C. M. Photographs and characteristics of the MB01 antenna assembly for the RC-160 (C1100) autosearch receiver. (Harvard Univ Radio Research Lab Tech Memo 411-TM-93) Mar 1944. 10 p. Price: Microfilm-50¢ - Photostat-$1.00
Two charts showing electrical characteristics, and 4 photographs showing the two antennas making up the antenna system for the RC-160 Autosearch Receiver. The cone antenna is designed to operate in the high frequency range (300-1000 Mc) and the stub antenna is designed to operate in the low frequency range (100-400 Mc). No text is given.

PB 20833. DIETZE, E. Measurement of projector and hydrophone performance, definitions and terms. (OSRD Rept 4245) Sep 1944. 62 p. Price: Microfilm-$1.00 - Photostat-$5.00
On July 19, 1944, a meeting of representatives of the Navy Department and the Hydrophone Committee of OSRD was held to reach agreements on various quantities used in defining the performance of underwater projectors and hydrophones. This report discusses the definitions and terms agreed upon. Definitions were agreed on for the following topics: Transmitting response; projector efficiency; receiving response; threshold; and impedance. Drawings and graphs. This work was carried out under contract with Columbia University Underwater Sound Research Laboratories.

PB 15315. DILLON, R. E. and HYGHS, L. J. Compact horns intermediate between polyrods and reflectors. (MIT Radiation Lab Rept 961). Jan 1946. 6 p. Price: Microfilm-50¢ - Photostat-$1.00
Compact antennas whose radiating elements are dielectric rods are described. For a given beam width they are shorter than the end fire antenna that would give the same beam width, and their aperture is smaller than the reflector that would give the same beam width. Diagrams.

PB 20245. DUSHMAN, SAUL. Report of progress of work on dark trace tube. (NDRC Rept 14:147). Mar 1943. 107 p. Price: Microfilm-$4.50 - Photostat-$30.00
This report describes research done by General Electric Company on a dark (DT) cathode ray tubes. This work consists of: (1) Design and fabrication of DT tube; (2) film thickness; (3) effect of temperature of glass on characteristics of KCl deposit; (4) electron diffraction studies of KCl films on glass; (5) angle effect in deposition of KCl films; (6) miscellaneous observations on KCl films; (7) observations made with demountable tube; (8) structure of DT films and scattering characteristics; (9) measurement of contrast; (10) modifications in DT tube construction; (11) results of tests on DT tubes made in the research laboratory; (12) study of cathodes in DT tubes; and (13) lighting and projection of DT tubes. Appendix I is "A method for testing DT tubes," by L. R. Koller. Appendix II discusses vapor pressure of KCl. There are 25 figures, consisting of photographs, outline drawings, graphs, and circuit diagrams.

PB 20257. ESTERMANN, I. and STERN, O. Darkening and bleaching of KCl. (NDRC Rept 14:177). Sep 1943. 33 p. Price: Microfilm-50¢ - Photostat-$3.00
The dependence of the darkening of KCl screens and single crystals on voltage and current density of the electron beam, intensity of illumination, duration of exposure, and thickness of screen was investigated. The rate of bleaching under different intensities of illumination was also measured for evaporated screens and single crystals. Drawings and graphs are included. A further study is described in PB 20254. The work was done at Carnegie Institute of Technology.

PB 20254. ESTERMANN, I. and STERN, O. Darkening and bleaching of KCl. II: The effect of temperature. (NDRC Report 14:208). Nov 1943. 17 p. Price: Microfilm-50¢ - Photostat-$2.00
It was found that the equilibrium and saturation darkening of pure KCl screens increases strongly with decreasing temperature and that it is about five times as large at -80°C. than at +100°C. The rates of darkening and bleaching increase with rising temperature. This report continues studies made by Carnegie Institute of Technology in PB 20257. Graphs and a drawing are included.

PB 15307. HYGES, L. J. Lens feed for K-band pillboxes. (MIT Radiation Lab Rept 869). Jan 1946. 10 p. Price: Microfilm-50¢ - Photostat-$1.00
A feed for K-band pillboxes is described. It utilizes a glass lens which serves the double purpose of shaping the primary pattern and pressurizing the feed. Dimensions of the lens and primary and secondary patterns are given. Graphs are included.

PB 22410. FRY, WILLIAM J. and others. Design of crystal vibrating systems for projectors and other applications. (Office of Research & Inventions, Navy Res Lab 5-8-46) Aug 1946. 176 p. Price: Microfilm-$2.00 Photostat-$12.00
This publication presents a detailed study of crystal vibrating systems and design procedures essential to the design of sonar projectors. These procedures involve a general set of curves based on fundamental piezoelectric relations. Part I contains the design curves and detailed explanations of their use. Particular systems using ADP and X-cut Rochelle salt crystals are discussed as an additional guide to the use of the curves, and to illustrate important changes in the performance of the system brought about by changes in the design or the operating conditions. Specific topics covered by the design procedure include resonant frequency, electrical input impedance, transmitting response, receiving sensitivity, and efficiency. Part II contains the mathematical analysis and the derivations of the expressions used in constructing the curves. Appendices contain units, definitions, symbols, conventions, and tables and graphs of physical constants. The project was undertaken by the Naval Research Laboratory, Washington, D. C.

PB 14007. HARBURY, P. L. The A-2602, A-2608, and A-2612 cone antennas. (Harvard Univ., Radio Research Lab, Technical Memo. 411-TM-113) Jul 1944. 13 p. Price: Microfilm-50¢ - Photostat-$1.00
A2602, A2608 and A2612 cone antennas are all basically the same in mechanical construction and electrical performance and all three are to be used between 1000 and 3000 mc. There are several possible positions in which to install these cones on an aircraft (a) projecting down under the fuselage for vertical polarization (b) mounted horizontally on one or both sides of the plane for reception of horizontally polarized signals (c) mounted on either side of the plane with its axis tilted 45 degrees below the horizon and approximately at right angles to the axis of the plane. Mounted in this way the antenna will receive both horizontally and vertically polarized signals. Photographs, curves, and assembly diagram are included.

PB 14431. HARVARD UNIVERSITY. RADIO RESEARCH LABORATORY. Operating instructions for 931-tube tester (Type U400). (Report 411-IB-25A) 1944. 11 p. Price: Microfilm-50¢ - Photostat-$1.00
This is the accepted operating instructions, succeeding PB 14430 "Preliminary operation instructions." Changes are made in wording of some paragraphs.

PB 17871. HATHAWAY, J. L. and others. QBE receiver modifications. Jun 1943. 10 p. Price: Microfilm-50¢ - Photostat-$1.00
The purpose of the modifications described was the application of time variation of gain (TVG) to certain QBE echo ranging listening equipments installed on Navy ships. A superficial investigation of the QBE receiver revealed two outstanding defects which had to be corrected before the TVG could be inserted. First, the detector overloaded so severely that, on high level reception, a strong echo caused complete blocking of the detector; and second, the manual volume control was so sensitive that, below the halfway point, no appreciable signal could be passed through the receiver, regardless of the signal level. A TVG time delay circuit was applied to the grid of the detector. Diagrams and list of materials necessary to make these modifications in the field by ship personnel are included. Report is from Harvard Underwater Sound Laboratory, NDRC.

PB 22581. HAYWARD, R. W., Jr. Report of test of model XBZ (YN) radio transmitting equipment. (Naval Research Lab Rept R-2186) Nov 1943. 38 p. Price: Microfilm-50¢ - Photostat-$3.00
The model XBZ (YN) transmitting equipment is designed to work in conjunction with the model YL radio beacon equipment. It is planted at a desired point on land or in the water and at a predetermined time begins to radiate an intermittent signal consisting of a very high frequency carrier modulated by an audio tone. By using the YL antenna as a directive receiving antenna, the YL equipment may be lined up on this source of radiation. Thus the transmitter acts as a marker for determining the bearing of the desired landing point during landing operations. Tests indicate that the equipment, in general, meets Naval requirements. The minor defects noted are correctible. Tables and graphs are attached showing test results.

PB 19277. HEDMANSEN, R. V. and BUCKLES, R. A. Report of GCA operational trials by the Royal Air Force at Kirton Wolds, England, Jul-Sep 1943. Sep 1943. 42 p. Price: Microfilm-50¢ - Photostat-$3.00
This report, made by two U.S. Navy observers, covers tests of GCA Mark I (ground control approach) radar equipment at a British air field under actual war operational conditions with various types of aircraft in daily use and with the type of pilots available during time of war. The GCA system consists of a mobile ground radar system in which a human controller on the ground transmits to an aircraft pilot in the air appropriate directions, over standard radio telephone communication channels, to enable the pilot to maneuver his aircraft into line with the correct runway, at the proper range, and then along a desired glide path, as predetermined

for the particular type aircraft, to accomplish an accurate instrument approach. This brings the aircraft to within a few feet of the earth at the end of the runway, from which position visual contact landing may be made. Mechanism is described, and detailed report of the generally successful trials at Elsham Walds is given, together with conclusions from these trials. Appendices give list of personnel at trials, photographs of equipment, and logs of recorded GCA approaches. (Some of the pages in this copy are blurred and will not reproduce well.)

PB 15962. HOLLAND, F. H., JR. Evaluation of the electro-acoustic characteristics of transducers. Jan 1946. 66 p. Price: Microfilm-$1.00 - Photostat-$5.00
A transducer is any device which converts energy of one form into energy of another form. An electro-acoustic transducer is one which converts either electrical energy of a selectable frequency into acoustic energy of the same frequency or vice versa. Types of electro-acoustic transducers are hydrophones and projectors. This is a presentation of definitions, theory, measurements, and calculations which fundamentally characterize underwater sound transducers. A glossary giving definitions and meaning of symbols used in this report and a bibliography are included.

PB 14039. HULSTEDE, G. E. Notes on the use of APR 5 receiver at frequencies above 3000 megacycles. (Harvard Univ Radio Research Lab Tech Memo 411-TM-137). Aug 1944. 2 p. Price: Microfilm-50¢ - Photostat-$1.00
The APR 5 receiver using a coaxial type mixer was designed for operation between 1000 and 3300 mc. By using beating oscillator harmonics rather than fundamental frequencies this range can be extended to 4500 mc. or more. At the higher frequencies antenna transmission line attentuation may limit the usefulness of the receiver. Filters designed to segregate the signals into several bands are described.

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PB 4003. HUTNER, R. A. and others. Radar Height Finding. (MIT Radiation Laboratory Report No. C-9. File No. 14-238). 1943. 47 p. Price: Microfilm-50¢ - Photostat-$4.00
When ground and sea reflections occur, large oscillations in the curves of indicated height versus distance along a spherical earth are predicted theoretically for conical scanning, lobe switching, or maximizing on signal strength with a single beam. Experimental data from conical scanning and lobe switching equipment confirm these predictions. Limits of good height finding are calculated on the assumption of an error curve radiation pattern, negligible side lobes, cross-over at 0.8 power and a flat earth. This report discusses certain inherent limitations of devices employing a lobe switching or conical scanning technique for the determination of height. It is in some respects a sequel to reports C-2 (PB 3907, p. 358) and C-6 (PB 3730, p. 358) on propagation, although in this investigation the width of the antenna radiation pattern is of primary importance, and has been taken fully into account. Included in this report is 25 figures.

PB 18353. KAC, MARK. On the distribution of the average noise current in receivers. (NDRC Rept 14:306) Sep 1944. 23 p. Price: Microfilm-50¢ - Photostat-$2.00
A mathematical treatment of the subject is presented in this report, which was prepared at Cornell University. Three graphs are included.

PB 14044. KAMPHOEFNER, F. J. D-1908 spurious response indicator for D-101 and D-102 tuning units. (Harvard Univ, Radio Research Lab Tech Memo 411-TM-141) Sep 1944. 5 p. Price: Microfilm-50¢ - Photostat-$1.00
The D-1908 spurious response indicator is a simple device to be added to the RRL D-101, D-102 or similar tuning units in order that true responses can be distinguished from spurious responses that may occur when strong signals are being received. Preliminary RRL tests demonstrate the great value of this simple indicator in the presence of strong signals. It can be installed in the field with the aid of a standard tool kit and requires no test equipment, since the addition of the device does not affect the tracking. Three photographs are given.

PB 15098. KATZ, S. Instructions for types TTL-6 ( ), TTL-9( ), TTL-10( ), TTL-12( ), and TS-263/TPS-10 test sets. (MIT Radiation Lab Rept M-1693). Sep 1944. 45 p. Price: Microfilm-50¢ - Photostat-$5.00
The test sets enumerated in the title are portable, frequency modulated r-f generators, including the following components: an r-f oscillator; a thermistor bridge wattmeter; two attenuators, one calibrated, one uncalibrated; and a reaction type frequency meter. The systems applications of these test sets include measuring transmitter power and frequency; receiver sensitivity, bandwidth, and recovery time; tuning the radar and beacon local oscillators; and testing the performances of the TR and RT boxes, and of the AFC circuits. These four test sets differ from each other only in frequency coverage and in the provision of an externally triggered sweep. TTL-10( ) and TTL-12( ) test sets contain externally triggered sweep circuits, while for the other two a sweep must be provided. The frequency range of the TTL-6( ) and TTL-10( ) test sets is 9285 to 9455 mcps; that of the TTL-9( ) is 9008 to 9152 mcps; and that of the TTL-12( ) is 8990 to 9170 mcps. These instructions describe the uses in testing radar systems, the principles of operation and the components of these test sets. They were all designed by Group 55, Radiation Laboratory, M.I.T., Cambridge, Massachusetts. Photographs, diagrams and graphs are included.

PB 15323. KHULIHOSKI, S. J. Summary of the life test program on 3045, 4035, and 5022 hydrogen thyratrons. (MIT Radiation Lab Rept 865). Jan 1946. 66 p. Price: Microfilm-$1.00 - Photostat-$5.00
All life tests on hydrogen thyratrons at Radiation Laboratory have been made by using the tube as a switch in line-type pulse generator circuits. Life test or results of approximately 200 hydrogen thyratrons of all three tube types under a variety of conditions of pulse duration, pulse repetition frequency, anode voltage, and anode current are presented. The data indicate that the problems of cathode emission and gas pressure stability, have been overcome and a tube life of approximately 500 hours is now practical. Ther is also evidence that tube life can be extended to at least 2000 hours by conservative operation at lower power levels than indicated by the present specifications. Photographs, diagrams and curves are included.

PB 18380. LINDSLEY, DONALD B. A new type mechanical PPI tracking trainer. (NDRC Applied Psychology Panel 607; Informal Memo 26). Sep 1945. 7 p. Price: Microfilm-50¢ - Photostat-$1.00
This report describes a new type mechanical-optical PPI radar trainer, for training advanced students in tracking and plotting by air-search radar methods. It consists of a device for presenting on a mock-up screen of air-search radar gear two pips which respresent simultaneous flight courses of two aircraft targets. These may be made to manouver at any bearing and range.

PB 18376. LINDSLEY, DONALD B. Comment on illumination and visual factors in radar operating rooms. (NDRC Applied Psychology Panel-308; Informal Memo 4). Nov 1943. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
This report specifies two conditions which must be satisfied in planning the illumination of radar operating rooms: (1) minimum light and reflection in the immediate area of the oscilloscope screen and the radar operator; and (2) adequate light for plotting, telling and controlling functions elsewhere in the room. The report gives other recommendations in regard to lighting and gives a diagram of the canvas canopy enclosure for the oscilloscope operator.

PB 18379. LINDSLEY, DONALD B. Description of a radar air-search tracking trainer. (NDRC Applied Psychology Panel-604; Informal Memo 24). Aug 1945. 14 p. Price: Microfilm-50¢ - Photostat-$1.00
This report describes and illustrates (with sketches and photographs) the air-search tracking trainer. This device is a simple, optical-mechanical arrangement which simulates a plan position indicator and presents target echoes in a prearranged sequence of positions representing a plane (or planes) in flight. The students' task is to learn to track and report the movements of one or more planes accurately and quickly without confusion between the various flights.

PB 18377. LINDSLEY, DONALD B. PPI trainer equipment. (NDRC Applied Psychology Panel-206; Informal Memo 7). Jan 1944. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
In replying to questions concerning the Trainer Box BC-1070-B and Oscilloscope BC-776-A assigned to the project on selection and training of oscilloscope operators it was stated that the trainer provided excellent simulation of PPI presentations characteristic of GCI (SCR-588) and short range airwarning (SCR-602) equipment, including noise and interference patterns, rate of scanning, blip control, etc.

PB 18368. LINDSLEY, D. B. Preliminary report of results from oscilloscope operator tests, experimental edition. (Selection and training of oscilloscope operators, memorandum No. 4). (OSRD Rept 1813) n.d. 7 p. Price: Microfilm-50¢ - Photostat-$1.00
The preliminary report of results of a battery of oscilloscope operator tests, administered to Army radar operators and trainees indicates that (1) tests have sufficiently high reliability for individual prediction purposes, (2) their intercorrelations are of an order to indicate that they deal with related functions, yet there is sufficient independence to justify the inclusion of two or more tests in the same battery, (3) tests have "face validity", (4) the distribution of scores on the tests is satisfactory for selection purposes. Tables and graphs showing results are included.

PB 18378. LINDSLEY, DONALD B. Proposed recording system for students' performance on the trainer BC-1070-A. (NDRC Applied Psychology Panel-143; Informal Memo 11). Mar 1944. 7 p. Price: Microfilm-50¢ - Photostat-$1.00
This report describes a proposed system for recording the performance of students being trained on Trainer 1070-A. Diagrams of the recording unit and microswitch mounting shelf, wiring, and details of tripping pointer and microswitch position are included.

PB 17321. MATROSIAN, EDWARD DR. Organic vapors for self-quenched G. M. counters (Abstract). n.d. 1 p. Price: Microfilm-50¢ - Photostat-$1.00
This is an abstract of a study made of the characteristics of self-quenched G.M. (Geiger-Müller) counters filled with mixtures of argon and 28 different organic vapors comprised mainly of aliphatic halides and alcohols. This paper is from the Naval Research Laboratory.

PB 18004. PANORAMIC RADIO CORPORATION, NEW YORK, N. Y. Preliminary instruction book for Navy model MRU-1 panoramic radio adaptor. Jun 1943. 51 p. Price: Microfilm-$1.00 - Photostat-$5.00
The panoramic adaptor when connected to an ordinary radio receiver, enables the operator to see, on a screen, all stations receivable within a 50 kilocycle band of the station to which he is listening. This band extends 25 kc above and below the frequency to which the receiver is tuned. Maximum sweepwidth - 50kc. Input frequency - 400 kc ± 25 kc. power source required - 115/230 volts, single phase 50/70 cycles A.C.. The instructions cover a general discription, installation, operation and maintenance of the equipment. Photographs, tables and circuit diagram are included. The equipment was manufactured for Navy Department, Bureau of Ships.

PB 16488. PREISMAN, ALBERT. Final Report on Project C-26 Concerning: Developmental Model of an Interference Generator for the 15 to 30 Megacycle Spectrum. (OSRD Rept 670). Jun 1942. 114 p. Price: Microfilm-$1.50 - Photostat-$8.00
This report describes the development of an interference generator designed to disrupt one enemy communication channel at one time in the range from 15 to 30 mc. and having a power output of 50 watts. A discussion of the general nature of the problem precedes the specific description of the apparatus. Tests of this equipment performed at Ft. Monmouth, N.J. are described. Recommendations for the design of an improved model, based on this development, follow, and finally installation, operation, and maintenance instructions for the development model are given. This device consists of a transmitter, modulated to produce a warbling tone, a scanning receiver, and an oscilloscope unit with which it is possible to determine visually whether the transmitter output is on the same frequency as the enemy signal. Power is supplied by a 24 V. storage battery to a Holtzer-Cabot type MG-149 converter which converts the d.c. to 400 cycle, 115 volt a.c. Photographs, parts lists, performance curves, and schematics are included.

PB 17933. RADIO CORPORATION OF AMERICA, RCA VICTOR DIVISION. Installation, operation and maintenance instructions for model WEA Echo ranging/listening equipment. (Instruction Book 38113) Mar 1941. 160 p. Price: Microfilm-$2.00 - Photostat-$11.00
This equipment which includes a manual hoist-train mechanism utilizes a rotatable magnetostrictive projector transmitting supersonic impulses into the water for locating any submerged object within range of the equipment. The equipment also serves for under-water communication and for determination of the bearing of any source of noise or signals within the frequency range of the equipment. When the projector is trained directly aft the system may be used for sounding. On the rear of the projector is a rochelle salt crystal microphone which rotates with the projector and may be used for listening for supersonic noises. Parts lists, photographs, drawings, tube data, and manufacturers' bulletins are included in the appendix. The equipment was manufactured for the Navy Department, Bureau of Ships.

PB 17834. RADIO CORPORATION OF AMERICA VICTOR COMPANY, INC. Instructions for Navy model NM-3 under-water sound equipment echo sounding. (Instruction book 23916-1) May 1934. 79 p. Price: Microfilm-$1.00 - Photostat-$6.00
These instructions cover the installation, operation, and maintenance of the above named equipment, designed to furnish both indications and records of the depth beneath the keel. The projector is magneto-strictive in principle. The equipment operates from 440-volt, 3-phase, 60-cycle supply and draws approximately 3 amperes per phase at full load. Photographs appear throughout the text. Tables, diagrams and schematic diagrams are at the end.

PB 17763. RCA MANUFACTURING COMPANY, INC. Model DF-4 radio direction finder equipment, frequency range, 100-1500 kc, alternating current operation: Instructions. (Instruction Book 23962). Dec 1935. 58 p. Price: Microfilm-$1.00 - Photostat-$4.00
These instructions cover the installation, operation, and servicing of the direction finder. This equipment manufactured for the Navy Department, Bureau of Engineering, is designed to operate from 110 volt, 60 cycle, single phase service. The receiver is of the superheterodyne type and covers the frequency range of 100 to 1500 kc when properly installed and calibrated the equipment will accurately indicate the direction of propagation of pure or modulated continuous wave signals, either keyed or unkeyed, at any frequency within this band. Photographs, drawings, and schematic diagrams illustrate the manual.

PB 17767. RCA MANUFACTURING COMPANY, INC. Model DQ-2 radio direction finder equipment, frequency range, 100-1500 kc, alternating current operation: Instruction. (Instruction Book 23990). Jun 1937. 54 p. Price: Microfilm-$1.00 - Photostat-$4.00
These instructions cover the installation, operation, and servicing of the DQ-2 direction finder. This equipment manufactured for the Navy Department, Bureau of Engineering, is designed to operate from 110 volt, 60 cycle, single phase service. The receiver is of the superheterodyne type and covers the frequency range of 100 to 1500 kc. When properly installed and calibrated the equipment will accurately indicate the direction of propagation of pure or modulated continuous wave signals, either keyed or unkeyed, at any frequency within this band. Photographs, schematic diagrams, drawings, and curves illustrate the text.

PB 17441. RCA VICTOR COMPANY, INC., CAMDEN, NEW JERSEY. Model DO radio direction finder equipment, D. C. operated - range: 100-1, 500 KC. Instructions. (Instruction Book 23262) May 1933. 55 p. Price: Microfilm-$1.00 - Photostat-$4.00
This equipment is of the 115 volt, d-c, line operated superheterodyne type, and covers the frequency range of 100 to 1500 kilocycles, and when properly installed and calibrated, will accurately indicate the direction of propagation of pure or modulated continuous wave signals (either keyed or unkeyed) at any frequency in this band. Instructions are given for the installation, operation and servicing of the equipment and its components. Direction finder theory, circuit descriptions, electrical tests and calibration are given. Parts lists, photographs, drawings, curves, schematic and wiring diagrams are included. Manufactured for the Bureau of Engineering, Navy Department.

PB 14038. RECORD, F. A. Survey of microwave power oscillators. (Harvard Univ, Radio Research Lab Tech Memo 411-TM-135) Aug 1944. 6 p. Price: Microfilm-50¢ Photostat-$1.00
Investigation of possible types of oscillators suitable to use at high frequencies other than Klystrons, and CW noise-modulated S-band magnetrons. Survey is made of small conventional tubes, telescopic triodes cylindrical tetrodes, velocity -modulated tubes and positive grid tubes. Investigations lead toward a series of coaxial cylinders supported at the ends by annular glass seals, with appropriate apertures for focussing the exciting electrons. The resonant circuit for such a tube is an extension on either side of the tube cylinders with shorting plungers at the ends i.e., a centerfed coaxial line.

PB 15267. RISSER, J. R. Characteristics of horn feeds on rectangular wave-guide. (MIT Radiation Lab Rept 656). Dec 1945. 45 p. Price: Microfilm-50¢ - Photostat-$3.00
A mathematical treatment of the subject. An appendix includes a suggested procedure in designing a horn. Graphs and drawings and a bibliography are included.

PB 15237. ROTHSCHILD, MAX. A/J performance of the final production model of AN/TPS-3. (Camp Evans Signal Lab Tech Memo 103). Aug 1944. 9 p. Price: Microfilm-50¢ - Photostat-$1.00
Method and results of tests on the AN/TPS-3 radar under various jamming conditions are described to indicate the effectiveness of its A/J circuits. Definite protection was indicated when the radar was subjected to CW, Pulse and sine wave MCW jamming. Minimum detectable signal was 4.0 microvolts which checks closely with the calculated value of 4.2 microvolts. Six graphs and a block diagram are included in this report.

PB 16870. RUDNICK, ISADORE. The propagation of an acoustic wave along a boundary. Jun 1945. 11 p. Price: Microfilm-50¢ - Photostat-$1.00
This report contains a discussion of the applicability of the theoretical equation for the reflection coefficient for plane waves incident on a plane boundary to practical problems. Especially at the grazing incidence it is impossible adequately to approximate the plane wave conditions which were assumed and indiscriminate application of this reflection coefficient may lead to serious error. A solution which holds for grazing angles is suggested and a discussion of its results is given. Graphical illustrations are provided.

PB 15293. SHERMAN, D. F. An X-band hemi-isotropic radiator. (MIT Radiation Lab Rept 981). Jan 1946. 6 p. Price: Microfilm-50¢ - Photostat-$1.00
This report describes the present status of an X-band antenna which shows promise of producing a radiation pattern horizontally polarized and of uniform intensity at every point over a hemisphere. Diagrams and photographs illustrate the text.

PB 15305. SPENCER, R. C. Fourier integral methods of pattern analysis. (MIT Radiation Lab Rept 762-1). Jan 1946. 37 p. Price: Microfilm-50¢ - Photostat-$3.00
The development of high gain antennas for microwaves has brought into existence problems which resemble those in optics. Although the exact solution must be in agreement with electromagnetic theory, the simpler scalar theory of physical optics or sound is sufficient for many problems. Since the radiation pattern of an antenna at a large distance can be expressed as a Fourier integral of the currents over the antenna, certain theorems concerning the Fourier Transform are found to be useful inyielding short-cut solutions. The present report is the first of three sections on methods of diffraction pattern analysis. Following an elementary introduction, several Fourier integral theorems are developed which form the basis for a number of short-cut methods. These are illustrated by numerous practical examples which include the effect of linear phasing and polarization. Diagrams are included.

PB 17833. SUBMARINE SIGNAL COMPANY, BOSTON, MASS. Installation, operating and maintenance instructions for Model MM-4 echo sounding equipment. 1936. 100 p. Price: Microfilm-$1.00 - Photostat-$7.00
This system is a device for obtaining ocean depths in fathoms. The sound producer, which serves also as the receiver of the echoes, is a magnetostrictive projector which operates at a frequency of approximately 18 kc. In depths to 400 fathoms, the operation is automatic. In greater depths, the operator must listen with head telephone receivers to note the time of return of the echo and read the corresponding depth. The power required to operate the system is about 3 k.w. under full load. Tables, photographs, diagrams and schematic diagram appear in the text and at the end. The equipment was made for installation on submarines under contract with the Navy Department, Bureau of Engineering.

PB 17831. SUBMARINE SIGNAL COMPANY, BOSTON, MASSACHUSETTS. Installation, operation and maintenance instructions for Model MM-5A echo sounding system. 1935. 118 p. Price: Microfilm-$1.50 - Photostat-$8.00
This is a device for obtaining ocean depths in fathoms. The timing of the interval between the creation of the signal and the return of the echo is effected by rotating a disc at a known constant speed and noting the angular rotation of the disc during the interval by reference to a scale which is graduated to read directly in fathoms. In depths up to 400 fathoms the operation is automatic. In greater depths, the operator must listen with head telephone receivers or an audible indicator to note the time of return of the echo and read the corresponding depth. The system, as a whole, operates from the ship's 440 volt, 60 cycle, 3 phase power supply. The instructions cover description of the apparatus, principles of operation, installation, and maintenance. Tables, graphs, diagrams, photographs, and schematic diagram appear in the text and at the end. The equipment was made under contract for the Navy Department, Bureau of Engineering.

PB 17827. SUBMARINE SIGNAL COMPANY, BOSTON, MASS. Installation, operation and maintenance instructions for Models QC-7 and QCG echo ranging-listening equipments and Model JK-3 sound listening equipments. 1937. 136 p. Price: Microfilm-$1.50 - Photostat-$10.00
The models QC-7 and QCG ranging-listening equipments are devices for obtaining the range of neighboring vessels, mines, buoys, etc., by producing a suitable signal on a vessel equipped with either system and measuring the length of time elapsing before the return of the echo from the target while simultaneously determining its bearing. The model JK-3 sound listening equipment is used with these ranging-listening equipments in detecting and determining the direction of distant vessels by listening to their propeller noises. The magnetostrictive sound producer, which serves also as a receiver of the echoes in the sound ranging portion of the system, operates at a nominal frequency of 24 kcs. The sound receiver, which serves as a receiver of the propeller noises operates in the range of 14 to 32 kcs. Photographs, tables, charts, outlines,

diagrams, and schematic diagram are attached to the report. The equipment was manufactured under contract with the Navy Department, Bureau of Engineering, for installation on submarines.

PB 17801. SUBMARINE SIGNAL COMPANY, BOSTON, MASSACHUSETTS. Installation, operation and maintenance instructions for Model WEA echo ranging-sounding-listening equipment. Oct 1939. 222 p. Price: Microfilm-$2.50 - Photostat-$15.00
The equipment for installation in submarines described in this instruction book enables the operator to obtain automatic and semi-automatic soundings, and in conjunction with ship's accessory apparatus, to determine the range and bearing of various underwater objects such as other vessels, reefs, buoys, etc.; also to listen to high frequency sound generated by moving parts on other vessels, and to communicate telegraphically with other vessels similarly equipped. The projectors operate on the piezo-electric principle. Attached are block diagrams, schematic diagrams and drawings, photographs and tables. The equipment is manufactured for the Navy Department, Bureau of Ships.

PB 17480. SUBMARINE SIGNAL COMPANY, BOSTON, MASS. Instructions for modification of model QCB echo ranging equipment to convert it into an echo ranging-sounding equipment. Mar 1940. 11 p. Price: Microfilm-50¢ - Photostat-$1.00
These instructions cover the modification of model QCB echo ranging equipment to convert it into an echo ranging-sounding equipment. By means of the transfer selector switch, controlled by switches mounted in the ranging and sounding indicators, the equipment may be used for ranging or sounding. Complete schematic diagrams are attached to the instructions. The instructions were prepared for the use of the Navy Department.

PB 17826. SUBMARINE SIGNAL COMPANY, BOSTON, MASSACHUSETTS. Operation, maintenance and installation instructions for Model QB-1 echo ranging system and Model JK-2 sound receiving system. 1934. 78 p. Price: Microfilm-$1.00 - Photostat-$6.00
The Model QB-1 Echo Ranging System is a device for obtaining target ranges in yards. For short ranges the operation of the apparatus is automatic. For greater ranges the operator must listen with head telephone receivers to note the time of return of the echo and read the corresponding range. This model combines a range indicator, amplifier, rectifier power supply, and electron tube driver in a single compact unit. The Model JK-2 Sound Receiving System is a similar system for listening only, comprising a projector and an amplifier, both of which are duplicates of the corresponding units in the Model QB-1 System. Except for the projectors, the two systems are combined in a single compact unit and are not designed for separate mounting for the independent units. Each of the 5 elements of this combination is a self-contained unit and may be removed from the main rack for servicing or replacing. Interconnections are made entirely within the cabinet. The only external connections are2 wires to the supply line and 2 wires to each of the projectors. Tables and drawings are used throughout the text. Ten diagrams and a schematic diagram are attached. The equipment was manufactured for the Navy Department, Bureau of Engineering.

PB 17958. SUBMARINE SIGNAL COMPANY, BOSTON, MASS. Preliminary instruction book for Navy model WEB echo ranging-listening-sounding equipment. Mar 1943. 244 p. Price: Microfilm-$2.50 - Photostat-$17.00
The equipment described in this instruction book enables the operator to determine from an echo the range and bearing of various underwater objects such as reefs, buoys, vessels, etc.; to determine the bearing of a vessel by listening to underwater sounds produced by its moving parts; to obtain depth soundings; and to communicate telegraphically with vessels similarly equipped. The projector used for ranging and listening is a combination magnetostriction (QC) and Rochelle salt (JK) projector with the vibrating elements mounted vertically. The QC side is used entirely for ranging and the JK side for listening operation. However the JK side may also be used for ranging. The sounding projector operates on the magnetostrictive principle. The ranging-listening amplifier has a superheterodyne circuit. A remote training control unit trains the combination projector. An appendix has special instructions for test and alignment of type CBM-46165 receiver-amplifiers. Photographs, diagrams, and parts lists illustrate the manual.

PB 18338. SUMNER, W. A. Final report of work performed on contract OEMsr-1112 by Westinghouse Electric & Manufacturing Company, Sharon, Pa. (NDRC Rept 14:382) Dec 1944. 7 p. Price: Microfilm-50¢ - Photostat-$1.00
68 different components were designed in line with specifications of the MIT Radiation Laboratory, including pulse transformers, resonant charging chokes, resonant charging transformers, and filament transformers. The characteristics of these units are presented in tabular form.

PB 21133. UNION SWITCH & SIGNAL COMPANY, SWISSVALE, Pa. Control system for submarine mines: Final report. Jul 1943. 80 p. Price: Microfilm-$1.00 - Photostat-$6.00
This report covers development of improved systems for control of submarine mines used in harbor defense over a period of two and a half years. During this development many forms of control were suggested and several were tried at Fort Monroe, Virginia, in cooperation with the Submarine Mine Depot. Originally the control system was required for buoyant mines in which a relay contact is closed when the mine is struck by a boat. In December 1941, magnetic influence detectors came into the picture. Development was redirected to the end that the control system should operate with magnetic influence mines and also with various types of sonic mines. The control system in its present form will operate with any type of mine, the only requirements being that the mine contain an oscillator and that the detecting apparatus, as a result either of direct contact with or of magnetic, or sonic, or other influence, change the output of the oscillator by a substantial percentage. The report describes the problem, gives the history of the development, and a detailed description of the apparatus, with a description of some of the design features. Circuit and block diagrams and photographs are appended.

PB 18618. U. S. ARMY AIR FORCES. AIR TECHNICAL SERVICE COMMAND. ENGINEERING DIVISION. Installation of radio set AN/ARC-3 and radio compass MN-26C. Dec 1945. 34 p. Price: Microfilm-50¢ - Photostat-$3.00
Consists of 15 photographs and 19 detailed drawings illustrating the method for the installation of the above mentioned radio set and radio compass in an airplane.

PB 18730. U. S. JOINT BOARD ON SCIENTIFIC INFORMATION POLICY. Electronics Warfare, a report on radar countermeasures. Oct 19, 1945. 40 p. Price: Supt of Doc U S Govt Print Off 15¢
This report presents a short account of the development of radar countermeasures. The work on countermeasures was done by many groups. Civilian and military staffs of Army Air Forces, Army Signal Corps, and other War Department contributors, the Naval Research Laboratory, the Bureau of Aeronautics of the Navy Department, and Division 15 of the National Defense Research Committee of the Office of Scientific Research and Development, all cooperated in this work. In addition there were numerous essential contributions made by the industrial laboratories and contractors; and the producers of equipment in the electronics industry of the country have a unique story of their own to tell of the problems and accomplishments of manufacture. The various problems encountered in radar and the necessity for jamming are discussed in this publication. The countermeasures "Carpet" and "Window" are discussed and the work done in countermeasures in various theatres of war is covered in some detail.

PB 18045. U. S. NAVY DEPARTMENT. Installation, operation and maintenance instructions for models NM-13 and NM-13A echo sounding equipments. (Manufactured by Submarine Signal Company, Boston, Mass.). (Sub Sig Spec 8336). Oct 1938. 141 p. Price: Microfilm-$1.50 - Photostat-$10.00
The Model NM-13 and Model NM-13A echo sounding equipments are devices for obtaining ocean depths in fathoms by producing a signal under water and measuring the length of time elapsing before the return of the echo from the ocean bottom. The sound producer, which serves also as the receiver of the echoes, is a magnetorestrictive projector which operates at a nominal frequency of approximately 18 kilocycles. This instruction manual contains description of the apparatus, installation, operating, and maintenance instructions, list of major parts and spare parts, manufacturer's specifications and parts, tabular data, and 37 diagrams.

PB 13609. U. S. NAVY DEPARTMENT. BUREAU OF AERONAUTICS
Installation specification for model ARA-1 airborne IFF equipment as alternate to system number two of AN/APL-1. (NAVAER-EI-118) Aug 1944. 10 p. Price: Microfilm-50¢ - Photostat-$1.00
This specification presents a general description of the physical characteristics of the ARA-1 IFF equipment and gives detail requirements for a satisfactory installation of provisions for it as an alternate to AN/APX-1 IFF in Navy VF aircraft for which the ARA-1 equipment is specified and in which a radio and electrical console is to be provided. Electronic equipment list and drawings are included.

PB 13573. U. S. NAVY DEPARTMENT. BUREAU OF AERONAUTICS.
Installation specification for Model AN/APS-3, airborne radar equipment. (NAVAER -EI-109) Oct 1944. 27 p. Price: Microfilm-50¢ - Photostat-$2.00
Parts list, drawings, table of materials for cables, and cabling diagrams are included in this report.

PB 13608. U. S. NAVY DEPARTMENT. BUREAU OF AERONAUTICS.
Installation specification for model AN/ARW-3 air-borne radio equipment. (NAVAER-EI-122). Nov 1944. 9 p.
Price: Microfilm-50¢ - Photostat-$1.00
The purpose of this specification is to give in detail BuAer requirements and other information necessary for completing a satisfactory installation of the AN/ARW-3 air-borne radio equipment in aircraft for which this equipment is specified. BuAer E-728A lists parts required for an installation. Drawings E-514A, E-699A, E-700A and E-701A are also included.

PB 13610. U. S. NAVY DEPARTMENT. BUREAU OF AERONAUTICS.
Installation specification: Model AN/APG-4 air-borne radar equipment, with Modification I (dated 4 Jun 45). (NAVAER-EI-116). Jan 1945. 16 p. Price: Microfilm-50¢ - Photostat-$2.00
Includes equipment list and installation drawings.

PB 19877. U. S. NAVY DEPARTMENT. BUREAU OF AERONAUTICS.
Navy aeronautical specification: General specification for radio receiving set AN/ARW-26 ( ), principal components of; and amendment 2, General specification for radio receiving set AN/ARW-26(A), principal components of dated 1 Aug 1945. (NAVAER M-694). Mar 1945. 14 p. Price: Microfilm-50¢ - Photostat-$1.00
This specification lists requirements for prospective contractors on this receiving set. The equipment is used with target control transmitting equipment RC-56-(A) as the receiving end of a radio remote control system, permitting remote radio control of a target. The paramount requirement of the equipment is the reception of tone, amplitude-modulated, radio-frequency energy and selective operation of relays in response to different audio frequencies. All r-f circuits shall be capable of being tuned to pre-set carrier frequencies between 60 and 74 mc. Performance requirements and methods of inspection and test are set forth.

PB 19949. U. S. NAVY DEPARTMENT. BUREAU OF AERONAUTICS.
Operator's manual for AN/APS-4 aircraft radar equipment. Aug 1945. 29 p. Price: Microfilm-50¢ - Photostat-$3.00
This lightweight AN/APS-4 aircraft radar equipment is designed primarily for installation and use in carrier-borne aircraft and is used for search, intercept, beacon homing, and mapping or navigation. The equipment comprises a transmitter receiver, a junction box, a control box, two indicator amplifiers, and two indicators. The operator's manual describes how the equipment is used for each type of activity. A section on operating procedures is presented almost wholly in drawings and comic drawings. A series of "Do's and Dont's" lists all elementary activities. A series of drawings is given for three different procedures. Flight checks and adjustments are presented briefly with comic drawings to illustrate the points. The final section of the manual, dealing with indicator interpretation is also presented graphically.

PB 18069. U. S. NAVY DEPARTMENT. BUREAU OF ENGINEERING.
Installation, operation and maintenance instructions for Type CBM-46061A receiver-amplifier for use with Models QC-1A, QC-1B, QBA, QBA-1 and QCC-1 echo ranging equipment, Model QSB echo ranging-sounding equipment, Model QCD-1 echo ranging-listening equipment, Model JK-2B sound listening equipment. (Manufactured by Submarine Signal Co., Boston, Mass.)
(Sub Sig Co Spec 8444 Bu Eng Spec 56RE 4CA 1044A) 1938
117 p. Price: Microfilm-$1.50 - Photostat-$8.00
Type CBM - 46061A receiver-amplifier receives a signal in the range from 13 to 37 kc and produces an audible beat note of from zero to 1600 cycles. It operates on the super-hetrodyne principle. This equipment was intended to replace similar outmoded equipment in certain submarines. This manual gives installation and brief operation and maintenance information for the receiver-amplifier. It includes labeled photographs, installation and detail drawings, wiring diagram, schematics and parts lists.

PB 18048. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS.
Final instruction book for model OY radar operator training equipment. (Manufactured by Air-Track Manufacturing Corporation, College Park, Md.). Jun 1942. 60 p. Price: Microfilm-$1.00 - Photostat-$4.00
This equipment is used in conjunction with the RCA cathode-ray oscillograph. This model has been designed for stationary work. The purpose of this model is to familiarize the student with the type of image which is seen on the indicator screen of some radar equipments of the search type. This device can feed simulated signals which are under the control of an instructor into as many as ten cathode ray oscilloscopes. The book contains the following sections: general description analysis of the circuits, interconnecting cable and control settings, and maintenance. Parts lists, schematics, diagrams, photographs, and manufacturer's instructions for RCA no. 155B oscillograph.

PB 19247. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS.
Handbook of maintenance instructions for research models of AN/APG-17 (XN-2) and (XN-3) aircraft radar equipments. (Manufactured by RCA Labs., Princeton, N.J.). Nov 1944.
88 p. Price: Microfilm-$1.00 - Photostat-$6.00
The AN/APG-17 (Sniffer) is a radio release device similar to APG-4 but it operates at a higher frequency and utilizes a somewhat different circuit. This handbook covers the differences between the two models and gives a full discussion of those differences in installation, operation, theory, and calibration. The new frequencies used in this device, 1500 and 1380 Mc are covered by a signal generator which is described in an appendix. This handbook contains photographs of the complete equipment and its components, block diagrams describing its operation, schematics, graphs, and blueprint drawings.

PB 16035. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS.
Installation and maintenance of transmission lines, waveguides, and fittings. (Navships 900,061) 1945. 191 p
Price: Microfilm-$2.00 - Photostat-$13.00

This is a non-technical reference manual. Photographs drawings, cartoons, and tables supplement the text. Information is included on concentric bead supported lines, stub supported lines, solid dielectric coaxial cables, and pulse cables for high voltage use, as well as on waveguides and fittings and adapters for all lines mentioned. This book also discussed corrosion dangers and preventative maintenance methods.

PB 17916. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Installation, operation and maintenance instructions for model JP sound receiving equipment. (Manufactured by The Astatic Corporation, Youngstown, Ohio.) n.d. 93 p. Price: Microfilm-$1.00 - Photostat-$7.00
This equipment is used for the reception of underwater sounds. It is intended for installation on shipboard to detect the presence of other ships. It consists essentially of the following: (1) A directional hydrophone assembly; (2) a high gain audio amplifier provided with various filter units and audible and visual indicating devices; and (3) mechanical equipment by which the hydrophone assembly may be suspended in the water beyond the side of a ship and roated from the deck by an operator. This device is sensitive to sounds in the frequency range of 70 to 12,000 c.p.s. The handbook contains general description, description of major units, description of accessory units. Instructions are given for assembly, installation, adjustments, operation, maintenance and repair. Tables, drawings, schematics, and photographs illustrate the text. A list of parts is included.

PB 17887. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Instruction book for Loran receiving equipment Navy model X-DBS. (Manufactured by Radio-marine Corporation of America, 75 Variok St., New York, N. Y.) (Navships 900,755) Jun 1945. 11 p. Price: Microfilm-50¢ - Photostat-$1.00
This equipment is a modified R-65/APN-9 receiver-indicator, equipped with a detachable visor, antenna and power cables. The power supply frequency is 60 cycles per second with an allowable ± 3 cycles per second variation. The nominal power supply voltage is 115 volts. The power consumption is 225 volt-amperes at 0.95 power factor, when the "receiver gain" control is adjusted for maximum gain. This book contains sections on the following subjects: Equipment supplied, equipment modifications, installation and adjustment, spares parts list. A drawing and two schematics are included.

PB 17715. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Instruction book for Loran switching equipment Navy model UM. (NAVSHIPS 900-745; GEI-19667) Jul 1945. 119 p. Price: Microfilm-$1.50 - Photostat-$8.00
The model UM switching equipment is employed in transmitting stations of the loran system to correlate the major station equipments and to perform the auxiliary functions of shielding and of discriminating between local and remote pulses. Two signal switching units, a power switching unit, and three identical discriminatory units, all within a single housing make up the equipment. The instruction book is divided into the following sections: 1 - General description; 2 - theory of operation; 3 - installation and initial adjustments; 4 - operation; 5 - maintenance; and 6 - parts lists. Each section is augmented by tables, photographs, outlines or diagrams. The manufacturer is General Electric Company.

PB 17465. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Instruction book for modification of Navy models TDY/TDY-1 to Navy models TDY-a/TDY-1a radio transmitting equipment. (NAVSHIPS 900,551(A)) Aug 1945. 111 p. Price: Microfilm-$1.50 - Photostat-$8.00
This instruction book covers: (a) the modification of model TDY/TDY-1 radio counter-measures equipment to model TDY-a /TDY-1a, (b) operation of the entire jamming system, and (c) reconversion of the system to low-frequency operation (TDY/TDY-1). The modification of model TDY/TDY-1 equipment to model TDY-a/TDY-1a changes the frequency coverage of the original equipment to 2700-3330 Mc. The modification in general consists of alteration of the modulator and transmitter power supply, replacement of the power oscillator and its associated R.F. and antenna system, installation of a wave-meter, installation of an antenna control unit to provide a means of controlling the receiving and transmitting antennas, and installation of a waveguide switch to permit automatic switching of power output to either transmitting antenna. The instructions cover operation, installation, adjustments, and maintenance. Photographs, tables, diagrams and curves are used throughout the text and appear as the last section in the book. The manufacturer is Raytheon Manufacturing Company.

PB 17881. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Instruction book for Navy model JM-4 sono-radio buoy transmitting equipment. (Manufactured by Airplane & Marine Instruments, Inc., Clearfield, Pennsylvania) (NAVSHIPS 900,011 IB) Jun 1943. 113 p. Price: Microfilm-$1.50 - Photostat-$8.00
The purpose of this sono-radio buoy is to detect underwater sounds produced by moving power-driven water craft, and to transmit these to a listening station on shore as a warning that a moving craft is present in the waters within range of the buoy. Normally the buoy can detect the presence of a vessel underway at ranges of approximately 1500 to 2000 yards. This equipment consists of a buoy containing an FM radio transmitter operating anywhere in the range 70-90 mc. with an output of 6 to 8 watts, another buoy containing a large dry battery which powers the transmitter, and a Rochelle salt crystal hydrophone suspended approximately 60 feet under the transmitter. In operation a shore receiver may be up to 10 miles distant from the transmitter and is manually or automatically tuned to each of a number of buoys once each minute. This receiver is not included in the subject equipment. The instruction book gives a detailed description of the equipment and complete information on installation, operation and maintenance. Also included are numerous photographs, characteristic curves, parts tables, drawings and schematics.

PB 18005. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Instruction book for Navy model OAV-1 type CAIR-GOACD radar operator training equipment. (NAVSHIPS 919.2) n.d. 62 p. Price: Microfilm-$1.00 - Photostat-$6.00
This is a test signal generator for use in the training of personnel in the operation of anti-jam radar receivers, and to provide a test signal of constant frequency for use in aligning the intermediate-frequency amplifier stages in the CG-46ACQ type receivers. All controls and jacks required for operation are on the front panel. Power is derived from a 115-volt, 60-cycle, single-phase a-c supply. To generate synthetic jamming the test generator employs a variable frequency oscillator, covering the range between 150 and 250 megacycles. Jamming signals may be introduced into the receiver to simulate interference. To provide a 15-megacycle signal for use in aligning the intermediate-frequency section of this receiver a second oscillator stage is provided in the test signal generator. Tables, photographs, diagrams and schematic diagram appear in the text. The manufacturer is Electrical Reproduction Company, Chicago.

PB 18021. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Instruction book for Navy model CBC practice attack meter equipment. (Manufactured by Western Electric Company, Inc., New York, N. Y.). Jun 1943. 313 p. Price: Microfilm-$3.50 - Photostat-$21.00
This CBC equipment is for use on submarines and surface vessels which are employed for the training of personnel in the methods of attacking submerged submarines with depth charges. The wave that travels out from the explosion of a practice depth charge which is released by the surface vessel is detected by a hydrophone located on the submarine. This hydrophone consists of a rubber covered metal sphere which contains two microphones mounted at right angles to each other and which have sensitivity characteristics which vary with the angle from which the explosive wave is received. The equipment provides a means for determining a means for determing the magnitude of the error of the surface ship's attack. Included in this volume are detailed descriptions of the various parts of this equipment and their operation, instructions for installation, operation and maintenance; tables; charts; diagrams, photographs, drawings, and sketches.

PB 20801. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS.
Instruction book for Navy models ASG, ASG-1 aircraft radar equipment. (NAVAER 08-5S-24) Apr 1942. 366 p.
Price: Microfilm-$4.00 - Photostat-$25.00
The ASG and ASG-1 equipments, manufactured by Philco Corporation, are similar in design and identical in function. They are designed to be used aboard aircraft for the purpose of locating objects on the surface of the sea or in the air above the earth. In addition, beacon reception is provided for finding the home base. The equipments operate on the fundamental frequency of 3300 mc with a peak RF power output of 50 kw. The instruction book has sections on equipment, description, installation, operation, maintenance, and special test equipment. Also included are parts lists, photographs, schematic and wiring diagrams.

PB 17999. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS.
Instruction book for radio transmitting equipment. (Manufactured by Radio Engineering Laboratories, Inc. Long Island City, N.Y.). (NAVSHIPS 900.330). Jan 23 1945. 284 p.
Price: Microfilm-$3.00 - Photostat-$19.00
Following a general description of the Loran system this handbook gives instructions for installation and adjustment, operation, and maintenance of the equipment. The Loran system is a navigational system for determining positions by means of radio. Ordinarily over sea water, ranges may be expected of from 500 to 700 nautical miles during the daytime and up to 1400 nautical miles at night. For the latter, so-called "skywave" transmission is employed, which is not as reliable as daytime ground wave transmission. The equipment has a frequency range of 1700 to 2000 kilocycles, coverage attained in four bands. With a plate voltage of 17.5 kilovolts, double pulsed, the drain will not exceed 2.5 kilowatts. The input voltage may have a nominal value anywhere between 105 and 125, or 210 and 250 volts, 50-60 cycles single phase and produce and operating voltage for the equipment of 150 volts at the output terminals of the autotransformer. Photographs, charts, packing lists, parts lists, and diagrams supplement the text. Ten commercial bulletins covering various parts are appended.

PB 18060. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS.
Instruction book for sonar sounding equipment Navy Model NMC-2. (Manufactured by Submarine Signal Co., Boston, Mass.). (Navships 900,595(A)). Jun 1945. 102 p. Price: Microfilm-$1.50 - Photostat-$7.00
Model NMC-2 sonar sounding equipment measures ocean depths in fathoms by projecting a signal vertically and measuring the elapsed time before the return of the echo from the ocean bottom. The timing of the interval between the emission of the signal and the return of the echo is effected by rotating a disc at a known constant speed and noting the angular rotation of the disc during the interval by reference to a scale graduated to read directly in fathoms. Operation is automatic in depths less than 2000 fathoms. A semi-automatic method supplements the automatic method in depths greater than 200 fathoms. This volume contains sections on the following topics: General description; theory of operation; installation; operation; maintenance; parts and spare parts list. Drawings, diagrams, and tables are included. The unit includes an automatic recording device.

PB 18035. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS.
Instructions for the operation of SC-1 radar. 1944.
13 p. Price: Microfilm-50¢ - Photostat-$1.00
The purpose of this manual is to describe the mechanics of operation of a Navy SC-1 radar. The manual gives instruction on the identification of controls, placing of equipment in operation, search procedure and shutting down of the equipment. Helpful diagrams and photographs as well as an appendix dealing with true and relative bearing, and range scales are included.

PB 20800. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS.
Operating manual, revised, for Navy model ASD aircraft radar equipment. (NAVAER 08-5S-40) Apr 1945. 47 p.
Price: Microfilm-50¢ - Photostat-$4.00
Installation, adjustment and operating instructions are given for ASD aircraft radar equipment. Outline drawings for various units, cabling schematic, and cable connections are included.

PB 17862. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS.
Preliminary installation instructions for projector-seaboard replacement units for use with Navy model QCU magnetostriction ranging/listening equipment. (Manufactured by RCA Victor Division, Radio Corp. of America, Camden, N. J.) (IB-38299-P1) n.d. 24 p. Price: Microfilm-50¢ Photostat-$2.00
The purpose of this equipment is to provide the necessary components for replacement of projector-seaboard units that may have been damaged or lost due to accident, enemy action, etc. These instructions provide the necessary information for installing projectors, domes, projector training shafts and their associated "streamlined," shaft and stay bolts, in the hoist-train mechanism of the model QCU equipment. Complete information on the model QCU equipment will be found in the instruction book (IB-38215, Navships 9000, 299-IB). Instructions for first-aid treatment for electric shock are included. Diagrams and photographs are included.

PB 17729. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS.
Preliminary installation, operation and maintenance instructions for the model NMB echo sounding and recording equipment (manufactured by Submarine Signal Co., Boston, Mass.) (Sub Sig. Spec. 8339C) Nov 1939. 37 p. Price: Microfilm-50¢ - Photostat-$3.00
This equipment is a device for obtaining and recording ocean depths in fathoms by producing a supersonic signal in the sea water and measuring the time elapsing before the return of the echo from the ocean bottom. In depths less than 2,000 fathoms, the operation of the apparatus is automatic, and indications are provided with a minimum of attention or adjustment of controls by the operator. A permanent record of depths up to 2,000 fathoms may be obtained in conjunction with visual indications. A semi-automatic method, whereby the operator listens for the return of the echo with head telephone receivers or loud speaker and notes the depth indication at the return of the echo, is provided to supplement the automatic method in depths greater than 200 fathoms, and to extend the range of observation beyond the maximum depth obtainable by the automatic method. This book contains sections on the following subjects: Description of the apparatus, operating instructions, installation and maintenance instructions, provisional major parts and spare parts list. Diagrams are included.

PB 17917. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS.
Preliminary instruction book for Navy model JQ underwater sound equipment. (Manufactured by The Brush Development Co. Cleveland, Ohio); and Preliminary working plans for the same model. Jan 1943. 46 p. Price: Microfilm-50¢ Photostat-$4.00
This equipment is a directional underwater sound device for shipboard installation for use in conjunction with an overside training gear. Its purpose is to detect the presence of other ships, submarines, or torpedoes in the vicinity and to determine the direction of the sound source by training a parabolic hydrophone in azimuth by means of the training gear. This device is sensitive to sonic and supersonic signals in the frequency range of 500 to 20,000 cps. Supersonic sounds are hetrodyned by means of an oscillator-mixer circuit in the amplifier unit. The description of the equipment is accompanied by photographs and drawings. There are instructions for installation, operation, and maintenance, schematics, a list of major units, and a parts list. There are photographs, and diagrams and the preliminary working plans of the model JQ underwater sound receiving equipment are clipped to the back cover.

PB 18071. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS.
Preliminary instruction book for Navy model MK-7 echo sounding equipment. (Manufactured by Submarine Signal Co., Boston, Mass.). (With change No. 1, dated 11 Oct 44). (NAVSHIPS 900,407 - I.B.) Oct 1944. 96 p. Price: Microfilm-$1.00 - Photostat-$7.00
The model MK-7 is a portable echo sounding equipment consisting of a recorder, transmitter-receiver unit. Its purpose is to obtain permanent records of water depths exceeding 200 fathoms. The complete equipment may be set up on any suitable small boat having a 6 volt DC source of power, capa-

ble of a steady drain of 15 to 20 amps. In operation, the transmitting unit sends to the sea bottom a sound wave which is reflected, as an echo to the receiver. The receiving unit transfers the sound wave into electrical energy which is fed to an amplifier and amplified to a valve sufficient to produce a mark on the chart paper at a point corresponding to the depth of the water. The manual offers instruction in the installation, operation and maintenance of the equipment. Parts lists, photographs, schematics, and connection wiring diagrams are included.

PB 18047. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Temporary instruction book for model OX radar operator training equipment. (Manufactured by Air-Track Manufacturing Corporation, College Park, Md.). Jun 30 1942. 78 p. Price: Microfilm-$1.00 - Photostat-$6.00
This temporary instruction book contains information on the installation, operation, and maintenance of Model OX radar operator training equipment. An analysis of the circuits and interconnecting cable and control settings is included with tables listing parts, manufacturers, and color codes. A report by RCA Manufacturing Co., Camden, N. J., entitled "Cathode-Ray Oscillograph, Stock No. 155B, Instructions", is enclosed.

PB 18036. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Temporary instruction book for Navy model SC-5, radar equipment. (Manufactured by General Electric Company, Schenectady, N. Y.) (GEI 20479) n. d. 274 p. Price: Microfilm-$3.00 - Photostat-$19.00
Navy model SC-5 radar is designed to locate simble objects, in bearing and distance, by sending out radio waves and by portraying on cathode ray tubes the "echoes" on reflections from the objects. The transmitter generates R-F voltages at a frequency of approximately 200 mc. Major units of this equipment are discussed with regard to construction, operation, maintenance and servicing. Included also are applicable schematic, connection, cabling, and socket voltage diagrams. Photographs of the components, parts list, and additional information will be contained in the final edition of this construction book.

PB 21894. U. S. WAR DEPARTMENT. Antenna kit for doublet transmitting antenna; drawing ES-E-252-F. (Tech Manual 11-2656) Jan 1945. 35 p. Price: Microfilm-50¢ - Photostat-$3.00
This technical manual covers the construction of a delta matched doublet transmitting antenna, a general purpose antenna for use in installations where the highly directional characteristics and gain of the rhombic are not required. The antennas are for use on frequencies from 2 to 16 mc. Drawings and installation diagrams are included.

PB 22365. U. S. WAR DEPARTMENT. Antenna support AB-26/CR. (Tech Manual 11-2688) Jun 1945. 31 p. Price: Microfilm-50¢ - Photostat-$3.00
This is an installation and maintenance manual for a 72-foot tubular, plywood, sectional mast for supporting antennas. Photographs and drawings are included.

PB 22363. U. S. WAR DEPARTMENT. Antenna supports AB-71/CR and AB-72/CR, and erection kits MX-326/CR and MX-327/CR. (Tech Manual 11-2662) Jan 1945. 26 p. Price: Microfilm-50¢ - Photostat-$2.00
These supports are sectionalized plywood masts designed for a maximum headload of 8,000 pounds. The manual contains instructions for installation and maintenance. It includes installation drawings and sketches of component parts.

PB 22019. U. S. WAR DEPARTMENT. Assembling and erecting 30-foot gin-pole-type trylon ladder towers. (Tech Manual 11-2614) Sep 1944. 14 p. Price: Microfilm-50¢ - Photostat-$1.00
This trylon antenna ladder tower is made of galvanized copper bearing steel. The towers are three sided and are built with legs of specially formed strip steel, shaped like a wedge. Adequate diagonal angle braces are provided for all three faces to balance the stress. Horizontal braces are attached on each face, while on the ladder side intermediate horizontal braces are added spaced 15 inches apart, forming a convenient ladder. This tower is to be used especially as a gin pole for the erection of the 72-foot, 7-inch lattice radio towers for rhombic antennas. A list of component parts, followed by instructions for assembly and erection are given. Detailed drawings illustrate the instructions.

PB 21954. U. S. WAR DEPARTMENT. SIGNAL CORPS. Antenna equipment RC-219-A and antenna AB-78-A. (Tech Manual 11-2630) Oct 1944. 24 p. Price: Microfilm-50¢ - Photostat-$2.00
This equipment comprises a multiband antenna system for use with interceptor radio receivers. The equipment provides continuous coverage at frequencies from 2 to 20 megacycles in addition to band coverage at higher frequencies. It consists of two vertical antennas and a horizontal doublet antenna. Antenna AB-78-A is used to cover frequencies below 2 mc. and consists of a mast with whip antenna attached. These antennas can be assembled and erected by 3 men and disassembled for erection elsewhere. Instructions for installation and maintenance, including moisture proofing and fungiproofing are included. Photographs, tables, charts, diagrams, and parts lists are included.

PB 13009. U. S. WAR DEPARTMENT. SIGNAL CORPS. Electron tube 1B27. (Sig Tentative Specification 71-2248) Sep 1945. 7 p. Price: Microfilm-50¢ - Photostat-$1.00
This specification describes tests to be performed on electron tube 1B27, a gas switching tube. Drawings are included.

PB 13001. U. S. WAR DEPARTMENT. SIGNAL CORPS. Electron tube 1N23. (Signal Corps Tentative Spec no 71-2218). Mar 1944. 5 p. Price: Microfilm-50¢ - Photostat-$1.00
This specification describes tests to be performed on a crystal rectifier designated as electron tube 1N23. Drawings of the mixer circuit used for testing the crystal rectifier are included.

PB 13002. U. S. WAR DEPARTMENT. SIGNAL CORPS. Electron tube 1N23-B. (Tentative Specification No. 71-2220) Mar 1944. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
This specification describes tests to be performed on crystal rectifier designated as electron tube 1N23-B. Drawing is included.

PB 13003. U. S. WAR DEPARTMENT. SIGNAL CORPS. Electron tube 2V41. (Sig Tentative Specification 71-2230) Jul 1945. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
This specification describes tests to be performed on electron tube 2V41, a tunable magnetron. Drawing is included.

PB 13006. U. S. WAR DEPARTMENT. SIGNAL CORPS. Electron tube 2V42. (Sig Tentative Specification 71-2235) Jul 1945. 5 p. Price: Microfilm-50¢ - Photostat-$1.00
This specification describes tests to be made on electron tube 2V42, a magnetron tube. Drawings are included.

PB 14841. U. S. WAR DEPARTMENT, U. S. NAVY DEPARTMENT, and AIR COUNCIL OF THE UNITED KINGDOM. Handbook of maintenance instructions for TS-56A/AP equipment. (CO-AN 08-35T356-3) n. d. 28 p. Price: Microfilm-50¢ - Photostat-$2.00
The Model TS-56A/AP Slotted Line Test Equipment is a device primarily intended to facilitate the installation and maintenance of ASB airborne radar antennas. This equipment is designed to operate over a frequency range of 360 to 675 mc, and has a characteristics impedance of 51 ohms. It can also be used for matching other antennas and in the measurement of characteristics of transmission lines, antennas and impedances. This instruction book gives information on operation, installation and adjustment, mechanical and electrical characteristics, and maintenance of the equipment. Drawings, parts lists, illustrations, and schematic are included.

PB 20804. U. S. WAR DEPARTMENT, U. S. NAVY DEPARTMENT and AIR COUNCIL OF THE UNITED KINGDOM. Operating manual for model AN/APS-2. (AN 08-10-161) Sep 1943. 79 p. Price: Microfilm-$1.00 - Photostat-$6.00
Model AN/APS-2 equipment is designed for installation in heavier than air aircraft. This manual covers the installation and operation of the equipment. No attempt has been made to explain the theory of operation or complete maintenance of the equipment. Addendum 1 supplies additional information necessary for the proper installation and connections of models AN/APS-2, AN/APS-2A, and AN/APS-2B. Addendum 2 covers the installation and adjustments of model AN/APS-2C equipment as used in four types of aircraft. Drawings and wiring diagrams are included.

PB 17412. U. S. WAR DEPARTMENT, U. S. NAVY DEPARTMENT, and AIR COUNCIL OF THE UNITED KINGDOM. Preliminary instruction book for pulse analyzer equipment models AN/APA-6A and AN/SPA-1. n. d. 82 p. Price: Microfilm-$1.00 - Photostat-$6.00
Pulse analyzer equipment AN/SPA-1 is to be used with receivers of the pulse variety which are designed to receive pulsing carriers rather than continuous waves modulated by low frequency. It consists of a wide band video amplifier which is capable of amplifying frequencies from 60 cycles to 2 megacycles. It enables the determination of the characteristics of unknown pulses, such as carrier frequency, repetition rate, shape of pulse, and relative amplitude. The AN/SPA-1 is intended for shipboard operation, while the lighter AN/APA-6A is for use in aircraft where saving of weight is important. The equipment is capable of analyzing pulses of any repetition rate up to 6000 cycles, and will operate for observation purposes on frequencies up to 10 mc. Applications of this equipment include observation of characteristic shapes of a signal for use in beacon spotting or flying on a beam and estimation of the difference in time between two pulses with range finding equipment. Parts list, photographs and diagrams are included. The book is undated, but a revision sheet has a May 1944 date.

PB 13957. VIDRO, E. F. Field patterns of M-2202 antennas for wing and belly mounting on B-17F aircraft. (Harvard University. Radio Research Lab Test Rep 411-TR-29A). Oct 1944. 20 p. Price: Limited number available for free distribution; thereafter, microfilm-50¢ - photostat-$2.00
Field patterns of M-2202 antennas were measured for two mounting positions on B-17F type aircraft: (a) under the starboad wing; and (b) on the belly of the ship beneath the radio compartment. A Carpet III transmitter on the ground was used for the signal source. A receiver in the aircrat was used to measure the relative signal picked up by the antenna being tested. The field pattern of the wing installations showed a characteristically unsymmetrical field. Signals to the rear were stronger than signals forward and broadside signals were stronger on the side on which the antenna was mounted. The belly mounting produced a nearly uniform field in one case. In the second case the field was distorted, presumably by other antennas located nearby. Photographs of installations and field pattern diagrams illustrate the report.

PB 17442. WESTERN ELECTRIC COMPANY, INC. Instructions for converting model QBF echo ranging equipment to model QJA echo ranging equipment. n.d. 143 p. Price: Microfilm-$1.50 - Photostat-$10.00
This equipment manufactured for the Navy Department, Bureau of Ships, has 3 principal uses: echo ranging, sound listening, and telegraph communication. Instructions for the conversion of Model QBF to Model QJA include the added maintenance of true bearing circuit, bearing deviation indicator unit, rotary contractor added to the projector training shaft in the retracting gear, the removal of the training lock limit apparatus, and the elimination of some of the junction boxes by means of the internal wiring and terminal mounting, and the improved mounting arrangement in the new frame and mount. Equipment is divided into 2 main groups located in the Sonar Hut and in a Sonar Room. A conversion chart, parts lists, tables, photographs, assembly drawings, figures, schematic and wiring diagrams are included.

PB 14900. WESTINGHOUSE ELECTRIC AND MANUFACTURING COMPANY. Instruction book for Navy Model ASB-3 aircraft radar equipment, Eng. 149. (I.B. 7148) Feb 1942. 188 p. Price: Microfilm-$2.00 - Photostat-$13.00
The Navy model ASB-3 aircraft radar equipment is a light weight equipment especially designed for installation on carrier-borne aircraft for use in searching for surface objects. The transmitter operates on a carrier frequency of approximately 515 megacycles, with a pulse length of approximately 2 microseconds, and a pulse frequency of approximately 400 cycles. The peak power output is in the order of 5 kilowatts. This instruction book covers description, installation, operation, and maintenance. Parts lists, photographs, and schematic diagrams are included.

Generators, Motors, Transmission, Distribution and Allied Equipment

French

PB 16022. U. S. WAR DEPARTMENT. CORPS OF ENGINEERS. ENGINEER BOARD. Letter report, French generator, electric, direct current, gasoline engine driven, portable, type K2, serial 380146, EB Reg No. 7017. Mar 1945. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
Subject item is a portable set manufactured by Bernard-Moteurs. The engine is a single-cylinder, 4-cycle, valve in head, gasoline type provided with magneto, adjustable mechanical governor and hand lever for starting. The generator is a direct current, shunt wound type provided with an adjustable field resistor for voltage control. Photographs are included.

German

PB 22578. JESSEN, OTTO. Report on German progress on high voltage DC power transmission. (FIAT Final Rept 517) Nov 1945. 8 p. Price: Microfilm-50¢ - Photostat-$1.00
During the war the German government supported two different experimental projects for DC high voltage power transmission. One project, using the Marx arc rectifier tube, was headed by Professor Erwin Marx of Braunschwig Technical High School. The other project was a joint effort of Siemens and AEG and used mercury arc rectifiers. The two projects are briefly summarized and reference is made to detailed descriptions which will be on available for inspection at the General Industrial Equipment Sub-committee, Washington, D. C.

PB 17255. SIEMENS - SCHUCKERT. Protos - trockengleichrichter. (Directions for use of the Protos dry rectifier). (Enlargement print of part of microfilm-180-3) n. d. 2 p. Price: Microfilm-50¢ - Photostat-$1.00
In German.

PB 20332. U. S. WAR DEPARTMENT. SIGNAL CORPS. German hand battery-charger, HLS.a; Handladesatz a. (Allied Forces Enemy Equipment Intelligence Service Rept 49) Oct 1944. 8 p. Price: Microfilm-50¢ - Photostat-$1.00
The German Hand Battery-charger HLS.a is a portable crank-operated charger for use with the German storage batteries 2.4NC28 and 2.4NC56. In emergency it may be used to charge the cells of American storage batteries. Customary German excellence of design and construction is apparent. Case may be secured firmly to a table or wooden base during operation. The generator is of the shunt-wound type, with a 15-ohm resistor in series with the field winding. This resistor is normally shorted out of the circuit; however, when the output current exceeds 4.5 amperes a relay operates to place the resistor into the circuit, thus preventing an overload. Until a voltage of 2.6 is being produced the circuit to the battery under charge is kept open by a second relay. Photographs and a circuit diagram are included.

Japanese

PB 21863. GRENELL, L. H. and others. Examination of enemy material: Metallurgical examination of a Japanese navy 1 KVA alternating current generator repair kit. Progress report 78, Jun 8, 1944. (OSRD Rept 3892) Jul 1944. 9 p. Price: Microfilm-50¢ - Photostat-$1.00
The bearings, springs, D.C. brushes, and the wrench contained in this kit were of ordinary design and material. The brushes, while formed by conventional powder metallurgy methods, contained almost 80% copper and had a specific gravity of 4.89. The bearing assemblies were finished by grinding rather than lapping. This method of finishing resulted in surfaces and tolerances slightly outside the standards acceptable in this country. The brush leads, which are normally attached by forming the brush directly around the lead, were riveted on, requiring several additional steps in manufacturing. Discussion of the protective coatings, photographs, photomicrographs, and tabulated data are included in this report prepared at the Battelle Memorial Institute.

United States

PB 16892. BEEGLE, D. H. and THOMASON, J. G. Test of Yardeny remote control system. (Naval Research Lab Rept R-1748) Jun 1941. 20 p. Price: Microfilm-50¢ - Photostat-$2.00
This device is an automatic selector mechanism which was claimed by its inventor to have a reset accuracy of .0001 degrees. The accuracy of the device was tested and its suitability for radio receivers and transmitters, aircraft turrets, machine guns, and other uses, was considered. The method used was to check the ability of the instrument to reset an oscillator to the proper frequency. Tests indicated that claims for accuracy were not substantiated but the principle of operation was found to be good and it was recommended that the device be accepted for navy use after improvements had been made. Test results are recorded in tables.

PB 20345. BELL, E. D. Report of test on a system control for direct current motor by means of unidirectional pulsating armature currents and constant field. (AAF ATSC Memo Rept EXP-M-53-553-69) Mar 1941. 9 p. Price: Microfilm-50¢ - Photostat-$1.00
Results are presented of tests run on a 24 volt d.c. motor with the armature current supply passing through an interrupter which permits the current to flow through the armature during varying portions of the cycle produced by one complete revolution of the disc cylinder of the interrupter. Tests indicated that this motor would stall under small increases in torque load or speed up greatly under small decreases in torque load; also very frequent maintenance periods would be required. Therefore, it is judged not suitable for speed control of turret motors. Exhibit A gives test equipment and an explanation of the results of the tests. Exhibits B and C are curves of test results, and Exhibits D and E mentioned in the report are not included.

PB 18337. SACK, H. S. and others. Preliminary results on calibration of autotransformers. (NBRC Rept 14:364) Jan 1945. 7 p. Price: Microfilm-50¢ - Photostat-$1.00
In this report a few preliminary data are given which were made with two Variac-type autotransformers. The linearity without load can be made within ± .1% by careful adjustment of the brushes. The results with load are less favorable. The report was prepared at Cornell University. The results are represented on graphs.

PB 19006. U. S. WAR DEPARTMENT. Generating set, gasoline engine driven, Kohler 1½KW, model DP-32, 1478 units. (Tech Manual 55-3006). Dec 1944. 72 p. Price: Microfilm-$1.00 - Photostat-$5.00
This technical manual describes the unit and is intended to be used as guide to its installation, operation and maintenance. Model DP-32 is an automatic marine model and has a water pump for cooling instead of a radiator. The engine is a 4 cylinder 4 cycle 2" bore 3" stroke type. The DC generator is rated at 32 volts and 47 amperes. Other models in the D-32 series are also described in this booklet. The text contains a parts list, photographs, drawings and wiring diagrams.

PB 18999. U. S. WAR DEPARTMENT. Generating set, gasoline engine driven, Onan, model OTC-15EE. (Tech Manual 55-3008) Nov 1944. 50 p. Price: Microfilm-50¢ - Photostat-$3.00
This instruction book describes both the 24-28 volt DC generator and the two cylinder, four cycle, L-head, air-cooled engine which can operate on natural gas as well as gasoline. Information is also given on 2 other units in the OTC 15 series. The text contains drawings, parts assembly sketches, cross sectional views, a schematic and a parts list.

PB 21912. U. S. WAR DEPARTMENT. Motor generator PU-2/G. (Tech Manual 11-969). Nov 1944. 29 p. Price: Microfilm-50¢ - Photostat-$2.00
This motor generator consists of a 5-horse power, 3,600 rpm, 220/440 volt, 3-phase 60 cycle electric motor which provides the motive power for a generator assembly, and a control box. The generator assembly consists of a 1,400 watt, 120-volt, 400-cycle inductor-alternator, and a 400 watt, 27-volt, d-c generator. Brief instructions are given for the installation, operation and maintenance of the unit and its component parts. Tables, photographs, diagrams and a parts list are included.

PB 21913. U. S. WAR DEPARTMENT. Power transfer panel CM-22/F. (Tech Manual 11-967). Sep 1944. 65 p. Price: Microfilm-$1.00 - Photostat-$5.00
This is a portable, automatic switching device designed for use in power systems to supply uninterrupted 115-volt, 60 cycle current to two communications loads. The transfer panel is designed to work with and control automatically 2 gasoline-engine-driven a-c generating sets, or with a 115-volt, 60 cycle commercial power supply and two generating sets. On automatic operation, two power sources carry the loads. In event of failure of either power source, voltage control relays transfer the load to the source still in operation, within 5 cycles after failure occurs. Instructions for the installation, operation, and maintenance of the unit and its component parts follows the detailed description of the panel. Photographs, tables, charts, diagrams, drawings and a parts list are included.

PB 22349. U. S. WAR DEPARTMENT. Power units PE-49-C, -D, -F, and -G, and motor generator MG-37-A. (Tech Manual 11-920) May 1945. 148 p. Price: Microfilm-$1.50 - Photostat-$10.00
These are compact, self-contained, light weight, portable power generating sets designed to supply continuous high and low voltage direct current for field radio transmitters. These units have a total output of 0.715 kw. each and are designed to provide a continuous high voltage output of 1,000 volts, 350 milliamperes, and a low voltage output of 14.6 volts, 25 amperes. The gasoline engines of the power units are 1 cylinder, 4 cycle, L-head types while the motor of the motor generator is a 220 ac, single phase, 50 cycle device. The description and specifications of the power plants and their components are followed by instructions for the operation, maintenance and repair of the units and their component parts. Photographs, tables, charts, wiring and schematic diagrams are included.

PB 22210. U. S. WAR DEPARTMENT. Power unit PE-79-F. (Tech Manual 11-912F) Oct 1944. 122 p. Price: Microfilm-$1.50 - Photostat-$9.00
This 240 volt, 60 cycle complete electric generator plant is used to furnish 3-phase power to operate signal equipment, lights, motors, heating units, and other appliances when commercial power is not available. A description of the component parts, with their functioning, is given, followed by instructions for operation, maintenance, and repair of the unit and its components. Photographs, drawings, charts, wiring diagrams, tables and a parts list are included.

PB 22345. U. S. WAR DEPARTMENT. Power units PE-85-L. (Tech Manual 11-916L) Jun 1945. 195 p. Price: Microfilm-$2.00 - Photostat-$13.00
This Power Unit is a base-mounted, compact electric generating set consisting of a 6 cylinder, 4 cycle, Diesel engine, an a-c generator, and a control panel. It is designed to deliver 25 kw. 230 volts, 3 phase, 60 cycle alternating current. It may be used as a power supply to radio transmitters or receiving sets, for power supply for field or shop equipment, for power for lighting systems or in conjunction with other power equipment. Instructions are given for the installation, assembly, operation, maintenance and repair of the unit and its component parts. Photographs, diagrams, charts, tables, and parts lists are included.

PB 21923. U. S. WAR DEPARTMENT. Power unit PE-142-D. (Tech Manual 11-942D). Jan 15, 1945. 210 p. Price: Microfilm-$2.50 - Photostat-$14.00
This manual covers installation, operation and maintenance of this complete, self-contained, internal-combustion-engine driven, electrical-generating equipment. It consists of a six-cylinder Diesel engine, directly connected to an alternator and exciter and develops 90 horsepower at its operating speed of 1,200 r.p.m. It is of the overhead-valve, liquid-cooled, four-stroke-cycle type. The generator, engine, engine cooling system and engine accessories are mounted on a rigid steel sub-base. The generator control panel (switchboard) is part of the equipment, and a power distribution panel and battery-charging panel are supplied as separate components. The generator consists of an alternator and exciter and is a 50 kc, 240-volt, 3-phase, 60-cycle unit. Parts list, photographs, drawings, fuel flow, wiring and schematic diagrams are included.

PB 22235. U. S. WAR DEPARTMENT. Power unit PE-162-B. (Tech Manual 11-971) Jul 2, 1945. 160 p. Price: Microfilm-$2.00 - Photostat-$11.00
This manual describes, the method of operation, preventive maintenance, and the repair of power unit PE-162-B. This is a compact lightweight electric generating set consisting of gasoline engine GE-12-D and d-c generator GN-50-A. It is designed to deliver 150 watts at 6.2 and 500 volts direct current for the operation of radio sets. Sectional views of the power unit, diagrams, drawings, charts, tables and photographs are included.

PB 21924. U. S. WAR DEPARTMENT. Power unit PE-185-A. (Tech Manual 11-925). Apr 12, 1944. 309 p. Price: Microfilm-$3.50 - Photostat-$21.00
This manual covers installation, operation, maintenance and repairs of this power unit intended for operation of electrical equipment, especially radio set SCR-271. It consists of a Diesel engine of the four-stroke cycle, full Diesel, solid injection type and a generator (also called the alternator). The three-phase, four-wire, 60-cycle alternator is rated at 25 kw., 31.25 kva., 86.5 amperes, at 80 percent power factor, 1200 r.p.m., 208/120 volts, at full load. It is directly connected to the engine and operates at engine speed which is 1200 r.p.m. Parts list, photographs, drawings, installation and wiring diagrams are included.

PB 22224. U. S. WAR DEPARTMENT. Power unit PE-197. (Tech Manual 11-940) Sep 1944. 90 p. Price: Microfilm-$1.00 - Photostat-$6.00
This is a self-contained power plant unit consisting of a gasoline engine, an electric power generator delivering 120 volt 60 cycle power and rated for continuous duty of 6.3 kva at 80% power factor and a control panel all enclosed in a sheet metal housing and mounted on a welded steel skid base. A description with functions of the parts, is followed by instructions for the installation, operation and maintenance of the unit and component parts. Photographs, wiring diagrams, charts, tables and a parts list are included.

PB 22351. U. S. WAR DEPARTMENT. Power unit PE-206-B and power unit PE-207-B. (Tech Manual 11-970) May 1945. 168 p. Price: Microfilm-$2.00 - Photostat-$12.00
These are diesel engine-driven electric power plants designed to furnish single-phase and 3-phase power respectively for 60 cycle operating equipment. The alternators of both units are rated at 15 kw., and 18.75 kva. PE-206-B is rated at 78 ampere output at 80% power factor and produces 120/240 volts, and PE-207-B is rated at 49 amperes and produces 220 volts. The 4-cylinder Diesel engines are the same for both units and are directly connected with them through flexible couplings. Following the description of the assemblies are instructions for the installation, operation, maintenance and repair of the units and their component parts. Photographs, charts, diagrams, tables, graphs and parts lists are included.

PB 22350. U. S. WAR DEPARTMENT. Power unit PE-215-B, and addenda dated May 1945. (Tech Manual 11-941) Mar 1945. 138 p. Price: Microfilm-$1.50 - Photostat-$10.00
This is a 6-cylinder, gasoline-starting Diesel engine directly coupled to a 50 kw. 240 volt, four wire, a-c generator with a separate belt-driven exciter, and a switchboard. The alternator is rated at 62.5 kva at 80 percent power factor and 150 amperes. Following a description including functioning of the parts are instructions for the installation, operation, and maintenance of the unit and its component parts. Photographs, diagrams, charts, tables and parts lists are included.

PB 21916. U. S. WAR DEPARTMENT. Power unit PU-6/TPS-1. (Tech Manual 11-933). Jul 1944. 87 p. Price: Microfilm-$1.00 - Photostat-$6.00
This power unit consists of a single-cylinder, air-cooled, 2-cycle gasoline engine, a generator and controls in a single portable unit weighing 128 lbs. The generator assembly consists of a 1,400-watt, 120-volt, 400-cycle inductor-alternator and a 400-watt, 27 volt direct current generator. Instructions are given for the installation, operation, and maintenance of the unit and its component parts. Photographs, exploded photographic views, tables, charts, diagrams and parts lists are included.

PB 21911. U. S. WAR DEPARTMENT. Power unit PU-36/U. (Tech Manual 11-976). Nov 1944. 73 p. Price: Microfilm-$1.00 - Photostat-$6.00
This electric generator set consists of a 4 cylinder, water cooled, gasoline engine component and a generator component mounted together on a steel skid base. It is used to furnish electricity to operate radio equipment, signal systems, lights, motors, heating units and other appliances when commercial power is not available. The rating of the Power Unit is 12.5 kw. (15.6 kva at 80 percent power factor). The generator may be connected as a 3-phase, 4-wire, 60 cycle 120/208 or 240/416-volt unit; or a 3-phase, 3-wire 120- or 240-volt unit. The description of the unit and its components is followed by instructions for the installation, operation, maintenance of the unit and its component parts. Drawings, exploded view sketches, diagrams, charts, photographs, tables and parts lists are included.

PB 21918. U. S. WAR DEPARTMENT. Power unit PU-30/T. (Tech Manual 11-944). Jan 1945. 91 p. Price: Microfilm-$1.00 - Photostat-$7.00
This power unit is a gasoline-engine-driven electrical generating set with an output of 15 kw., 18.75 kva at 80 per cent power factor, 120/240 volts, 60 cycles. The entire assembly, including 4 cylinder, water-cooled gasoline engine, generator, starting battery, and engine instrument panel, is mounted on a structural steel base. A self-supporting switchboard is included in this equipment. A detailed description and functioning of the parts are followed by instructions for the installation, operation and maintenance of the unit and its component parts. Photographs, tables, charts, diagrams, and parts lists are included.

PB 21914. U. S. WAR DEPARTMENT. Power unit PU-32/G. (Tech Manual 11-960). Dec 1944. 62 p. Price: Microfilm-$1.00 - Photostat-$5.00

This power unit consists of a conventional 4 cylinder automotive-type gasoline engine and an alternating current generator with the necessary accessories and controls, all mounted in a tubular metal frame with a skid base. The a-c output of the generator is designed for 3 possible circuits, (1) 120-volt single-phase, two-wire (2) 120-volts, 3- or 4-wire (3) 208 volts 3-phse, 3- or 4-wire. It may be used on single phase lighting and control circuits and single- and three-phase motor circuits at the same time. The rated capacity of this generator is 5.0 kw. at 60 cycles. Instructions are given for the installation, operation and maintenance of the unit and its component parts. Photographs, tables, diagrams, charts and parts lists are included.

PB 21922. U. S. WAR DEPARTMENT. Power unit PU-58/G. (Tech Manual 11-980). Jan 19, 1945. 158 p. Price: Microfilm-$2.00 - Photostat-$11.00
This manual covers installation, operation and maintenance of this complete 120/240-volt, 60-cycle, electric generating plant. It consists of an engine and an a-c generator with necessary accessories and controls, all mounted in a metal housing which serves also as a skid frame. The rated capacity of the power unit is 5 kw. at unity power factor and 6.25 kva. at 80 percent power factor. The engine is of the four-cylinder, four-cycle, L-head, water-cooled, automotive type. Parts list, photographs, drawings and wiring diagrams are included.

PB 22261. U. S. WAR DEPARTMENT. Transformer PH-281. (Tech Manual 11-2341) May 1945. 15 p. Price: Microfilm-50¢ - Photostat-$1.00
This manual provides instructions for operating, maintaining, and repairing the single-phase iron-core auto-transformer capable of stepping down 50- to 60-cycle, 130- to 260 volt input to 115-volt, 2 kva output which is described here. The transformer is designed particularly for use with 16-mm sound projectors when a 115-volt a-c source is not available. It can be used with all types of equipment that requires a 115-volt source provided that the transformer is not overloaded. Photographs and a wiring diagram illustrate the text.

PB 21902. U. S. WAR DEPARTMENT. Vibrator type inverter; 12-volt DC to 110-volt AC. (Tech Manual 11-2519). Jul 1944. 15 p. Price: Microfilm-50¢ - Photostat-$1.00
The vibrator type inverter converts 12-volt current to 110-volt, 60-cycle alternating current at a continuous output wattage of 100 watts, for the operation of a-c radio equipment or other electronic apparatus having a power factor not higher than 80% and an input rating not exceeding 90 watts. This manual contains instructions for installation, operation, and maintenance, together with a parts list, photographs, and a circuit diagram.

PB 21970. U. S. WAR DEPARTMENT. SIGNAL CORPS. Battery charger PE-163. (Tech Manual 11-2549). Jan 1945. 42 p. Price: Microfilm-50¢ - Photostat-$3.00
This illustrated manual gives instructions for installation, assembly, operating, maintenance and repair of this battery charger for charging and checking Batteries BB-51, BB-52 and BB-206. It is a self-contained unit, consisting of copper-sulphide and vacuum-tube rectifiers, current control rheostats, a meter, test circuits and necessary jacks. A power source furnishing 115-volt, 60 cycle a-c is required. Wiring and schematic diagrams are included.

PB 21158. U. S. WAR DEPARTMENT. SIGNAL CORPS. Power units PE-84-A, -C, -D. (Tech Manual 11-915) Jun 1945. 106 p. Available from the Supt. of Docs., Washington 25, D.C. Price: 35¢
Description and specifications for self-contained gasoline engine driven electrical generating units for fixed installation. The gasoline engine is a 4-cylinder, vertical, overhead valve, liquid-cooled engine. The Westinghouse generator is a single-phase, 2 wire, 60 cycle, a-c unit with a load capacity of 25 kva, 120 volts, 80% power factor. The direct connected exciter output is 1-3/4 kw, 125 volts, direct current. Instructions for installation and assembly are followed by operating, maintenance and repair instructions for the engine, generator and component parts. Photographs, tables, diagrams, charts and a parts list are included.

PB 21966. U. S. WAR DEPARTMENT. SIGNAL CORPS. Rectifier PP-125/VT. (Tech Manual 11-2529). Dec 1944. 19 p. Price: Microfilm-50¢ - Photostat-$2.00
This manual describes this rectifier and the functioning of its parts and gives installation, operation and maintenance instructions. It is a full-wave, selenium-disk rectifier capable of converting 95-to 125-volt, single-phase, 60-cycle a-c power into direct current for energizing coils of telephone relays and for pilot lamp circuits, located in mobile fire control trailers. It is enclosed in a steel case and weighs 28 pounds. It can be connected to a 95-to 125-volt, single-phase, 60-cycle a-c power source. It will provide a d-c output of 1½ amperes to no-load with voltage range of approximately 25 to 36. Parts list, photographs, schematic and wiring diagrams included.

Miscellaneous

Dutch

PB 22816. KLA, D. K. Phillips "Contact" electrodes type PH 55c and PH 48c. (Naval Tech Mission in Europe Tech Rept 360-45). Sep 1945. 5 p. Price: Microfilm-50¢. Photostat-$1.00
These heavily coated electrodes, made by Phillips Company of Eindhoven, Netherlands, are in the development stage only. Welding skill is not required for their use, and good results are obtained by dragging the rod along the plate. The welds made in this manner show good physical characteristics. Two sketches showing their application to welding are attached.

German

PB 17364. KABELWERK DUISBURG. Feuchtraumleitung. (Humidity proof cable). German patent - registered design, application MIS VII 68a 12 7002769 dated Sept 28, 1938. 6 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 18954. LYTHGOE, W. H. and others. German cable industry. (BIOS Final Rept 179, Items 21, 22, 31). Sep-Oct 1945. 117 p. Price: Microfilm-$1.50-Photostat-$8.00
This report deals with most of the largest electric cable-making firms and the associated producers of raw materials in Germany, with the exception of the Berlin area. Technical developments appear generally to have ceased in Germany about 1938-1939 so far as the cable industry is concerned. The industry was heavily damaged by the war and recovery is likely to be slow. General observations are made on copper and aluminum, rod and wire production, rubber cables, thermoplastic cables, impregnated paper cables, telephone cables, enameled wires, cellulose lacquered cables, and miscellaneous topics. These are followed by details of personnel interviewed and factories visited. Scale drawings of plastic extrusion machinery and schematic layout drawing for cellulose lacquering plants are included.

PB 18729. U. S. WAR DEPARTMENT. CORPS OF ENGINEERS. ENGINEER BOARD. Evaluation report, captured enemy equipment: German electric arc weld. (Reg 3407). Mar 1946. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
This report describes a captured German wheel-mounted, Diesel engine powered, electric arc welder rated at 200 amperes. The unit is comparable to commercial welders available in the United States although machines of this size are not usually powered with Diesel engines.

FUELS AND LUBRICANTS

German

PB 17246. BAMAG-MEGUIN A. G., BERLIN. Wassergas-anlagen (Water gas plants). (MIS VII 67g 7003029) n. d. 57 p. Price: Microfilm - $1.00 - Photostat - $4.00
This is a German sales catalog from Bamag-Meguin A.G., manufacturers of machinery and equipment for production of water-gas. The catalog contains description of the manufacturing process with photographs of the various equipment and installations. Included are drawings of plant installations, section views of equipment, graphs, tables, and a cost calculation for a daily production of 15,000 cu. m. water-gas.

PB 17600. GEWERKSCHAFT VICTOR. Data pertaining to cracking plants, Mar 31, 1938 through Jul 24, 1944. (MIS VII 67g 7003057) Mar-Jul 1944. 111 p. Price: Microfilm - $1.50 - Photostat - $8.00
This is a laboratory folder, in German, and contains typewritten results of tests, graphs, pencilled notes, etc. The various problems arising in a cracking plant are considered here and include measurement of carbon produced, relation between formation of carbon and steam used, cracking temperatures, cracking pressures, thermal balances of the plant, and thermal balances of gases involved in the cracking process.

PB 17245. GEWERKSCHAFT VICTOR RECKLINGHAUSEN, RAUXEL, RUHR, GERMANY. Miscellaneous production data for the period Aug 29, 1935 - Jun 10, 1938. (MIS VII 67 g 7002995; Folder 19) 1935-1938. 819 p. Price: Microfilm-$8.50 - Photostat-$55.00
The material consists of 819 production sheets giving data on production of synthesis gas in contact furnaces. Included are data on composition and properties of the catalyst. A photograph taken in 1938 shows a bank of contact furnaces.

PB 19608. HERMADEN, A. WINKLER VON. Geologische Kartierung in Südsteiermark (geological mapping in Southern Styria) (ALSOS Mission, RFR 505 50) Jul 1944. 3 p. Price: Microfilm - 50¢ - Photostat - $1.00
A short report on geologic mapping of Southern Styria carried out from 1943 to June 1944 by order of the Army High Command for the purpose of determining the tectonic structure of that region because it might contain petroleum. This work was in preparation of the drilling activities which were in process at the time of this report.

PB 19613. KAUTI, S. Erster halbjährlicher kurzbericht über den forschungsauftrag Ostmarklagerstätten (A)Ödenburger pforte (First semi annual short report on the research assignment "Deposits in Austria" (A) Ödenburger Pforte). (Reichsforschungsrat) (ALSOS Mission, RFR 505 45) Aug 1944. 2 p. Price: Microfilm - 50¢ - Photostat - $1.00
This is a report to the "Kohle-Öl-Union" von Busse, Kommanditgesellschaft (limited liability company) Berlin, on its concessions in the district of Ödenburg, Austria. The surveying and mapping task has been completed. To date no new prospects for petroleum could be discovered. The deep drilling tests at Zillingtal 1 (one) are still going on because there is still hope that they will be successful.

PB 19384. RICHTER, M. Ostmarkflysch (Flysch deposits in the Alpine zone of Austria). (Reichsforschungsrat) (ALSOS Mission, RFR 506 22) Dec 1944. 2 p. Price: Microfilm - 50¢ - Photostat - $1.00
A short report by Prof M. Richter of the Geological Institute of the Mining Academy at Clausthal giving a stratigraphic and tectonic survey on the Alpine region of Austria from the Ybbs river to the east. Primary oil rock formations have not been discovered in the Flysch deposits of that region.

PB 19401. SCHNEIDER. Entparaffinierung von mineralölen mit lösungsmitteln flüssiger phase zwecks herstellung kältebeständiger öle für die wehrmacht. Reichsforschungsrat (Use of liquid solvents to remove paraffin from petroleum in the preparation of cold-resistant oils for army use). (ALSOS Mission RFR 2) Dec 1944. 2 p. Price: Microfilm-50¢ - Photostat-$1.00
This is a very brief report on experiments on the synthesis of 250 solvents, and tests of their suitability for removing paraffin from petroleum that have been carried on since the last progress report in this series on paraffin removal was issued on 27 July 1944 have established, first, that there is an extremely variable selectivity in the amount of paraffin which can be separated from oil-paraffin mixtures, and second, that the liquid phase removal of paraffin is possible. In German.

PB 17595. STEINKOHLENBERGWERK "RHEINPREUSSEN", TREIB-STOFFWERK. A. K. and stabilisation plants, July 21, 1935 - Aug 9, 1943. (MIS VII 67g 7003027) Jul 1935 - Aug 1943 44 p. Price: Microfilm - 50¢ - Photostat - $3.00
Correspondance between the fuel plant of the "Rheinpreussen" establishment, which mines and consumes coal, and various German firms containing estimates of cost for the purification of Fischer Tropsch synthesis gas (comparison of purification with A.K., activated carbon, and that with fuller's earth) description and cost outlay for an activated carbon installation of the type "Carbo-Union", results of a checking of the installation, and details on and diagrams of new equipment. In German.

PB 17249. TREIBSTOFFWERK, RHEINPREUSSEN. Drawings of water gas generators at plant A, Jun 8, 1936 - Jun 8, 1944. (MIS VII 67 g 7003029) 1936-1944. 153 p. Price: Microfilm-$2.00 - Photostat-$11.00
This material consists of the following drawings from Rheinpreussen synthetic oil plant: Water gas generators, dust separators, gas cooling towers, synthetic gas producer, synthetic gas heaters, list of gauge stations with drawing, tables of data on testing generators, and laboratory data on coal analyses. The drawings were made in the period June 8, 1936 and Jun 8, 1944.

United States

PB 19803. EKLIND, PAUL G. and DASHIELL, J. W. Some characteristics of aircraft engine fuels: Their influence on capacitor type tank gauges. (OSRD Rept 4016) Jun 1944. 48 p. Price: Microfilm - 50¢ - Photostat - $4.00
The capacitor type fuel quantity gage appears, at the present time, to afford the most promise of the different types investigated. The work described in this report was undertaken to determine the limitations which would be placed upon the capacitor gage by the fuel itself. Measurements were made of dielectric constant and density of representative samples of aircraft engine fuels over a wide range of temperature as well as of the hydrocarbon compounds which are combined in various proportions to make these fuels. The influence of those additives normally present in aircraft engine fuels on the dielectric constant was also studied. The problem of contaminants was considered and an investigation of the effects of the more common materials encountered in service was undertaken. Dielectric constant and density measurements were made with standard equipment. Information on composition of fuels was obtained from those familiar with current refinery practice. Some literature searches were made to obtain information on the effect of various contaminants on fuels. Drawings, tables and graphs are included.

PB 22464, 22469, 22474, 22478, 22479, 23209-23214.
FENSKE, M. R. and others. Hydraulic, recoil and special oils. Reports nos. 1-11. May 7, 1941 - Mar 1, 1946. (OSRD Repts) Microfilm and photostatic copies at prices listed below.

PB No.	OSRD Rept.	Date	Pages	Prices Micro.	Photo.
23209	96	Mar 15, 41 - May 7, 41	97	$1.00	$ 7.00
23210	143	May 7, 41 - Aug 15, 41	142	$1.50	$10.00
23211	188	Aug 15, 41 - Nov 25, 41	90	$1.00	$ 6.00
23212	459	Nov 25, 41 - Mar 6, 42	99	$1.00	$ 7.00
23213	695	Mar 6, 42 - Jun 30, 42	190	$2.00	$13.00
23214	1029	Jun 30, 42 - Nov 17, 42	253	$3.00	$17.00
22479	1369	Nov 17, 42 - Apr 8, 43	295	$3.00	$20.00
22464	1894	Apr 8, 43 - Sep 24, 43	276	$3.00	$19.00
22469	3499	Sep 24, 43 - Apr 11, 44	367	$4.00	$25.00
22474	4492	Apr 11, 44 - Dec 12, 44	547	$5.50	$37.00
22478	6643	Dec 12, 44 - Mar 1, 46	671	$7.00	$45.00

These reports present the developments of the work done on an NDRC project relating to hydraulic, recoil, and special oils for the Army Air Force Bureau of Aeronautics, the Navy Bureau of Ordnance, and the Army Ordnance Department. The work, which was begun in 1941 and completed in 1946, was carried on at the Petroleum Refining Laboratory, School of Chemistry and Physics, at Pennsylvania State College under the direction of Dr. Fenske. From a general study of hydraulic fluids specifications were evolved for three special oils. These were: The Army-Navy Aircraft Hydraulic Oil, specification AN-VV-O-366a; the Navy Hydraulic Oil, specification OS-2943; and Army Recoil Oil, specification AXS-806. The first report (PB 23209) submitted by the laboratory covers a literature survey of available data on a wide range of materials that might conceivably be useful in hydraulic oils and analyzes these data in terms of the viscosity and other requirements of hydraulic oils. It also covers experimental work on a number of materials, in particular various hydrocarbon blends either of natural products or containing additives. No reference is made in this first report to the actual military reasons for setting certain goals to shoot at in the viscosity-temperature relationships but data available from the services were used in determining the desired viscosity at -40°F. and at 100°F. This program of work covers a study of the viscosity-temperature characteristics of hydrocarbon and non-hydrocarbon fluids, the utilization of viscosity index improvers, the stability and corrosive characteristics of fluids and the freezing point or melting point of these fluids. This program is planned to be expanded to cover the special properties required for recoil oils as well since a large amount of the information being obtained on hydraulic oils will be of advantage in the study of recoil oils. Up to the time of this report no specific work had been done on the recoil oil problem. The second report (PB 23210) continues and extends the work presented in the first report. About 350 different materials and blends (over 90 of them non-hydrocarbon materials) were examined as base stocks for hydraulic fluids. It is shown in the report that hydraulic fluids of vastly improved viscosity characteristics can be made in a number of ways. One drawback was still found in that all the fluids showing decided improvement over present specification material do have somewhat reduced flash points. The NDRC committee announced that it had not yet developed the proper limitations on flash points for these oils but that steps were being taken to determine this. With the flash points determined it was believed that it would be possible to determine hydraulic oils of greatly superior viscosity characteristics. The report indicates methods of approach in improving hydraulic oils from various sources. It also shows that as far as the lighter hydraulic oils are concerned, viscosity breakdown due to shear is probably of very minor importance. This phase of the work was extended to cover the recoil oils as well and the program contemplated the development of one recoil oil that would be satisfactory for the different types of recoil mechanisms and also would cover the entire range of atmospheric temperature conditions that might be encountered. Progress report three (PB 23211) stated that the three difficulties presented in the previous report, namely, galling at low temperature, lower flash points, and inadequate A.S.T.M. slopes had for the most part been overcome. The work of the laboratory had developed decidedly improved hydraulic oils which may be obtained from several sources. For instance, barrel quantities of a base stock made from a paraffinic (Pennsylvania) and from a naphthenic (Columbian) crude have been produced. Also, two additional agents for improving viscosity-temperature relationships were found to be applicable, namely, polybutene LM and Acryloid. It is stated in this report that samples of hydraulic oils prepared from these ingredients will be sent to the Material Division of the Army Air Corps and to the Navy Bureau of Aeronautics for testing. At this time the combination of polybutene LM and naphthenic gas oil was available in the shortest time in quantity while the combination of Acryloid and dewaxed, narrow cut Pennsylvania oil which gives the best results might require some delay to get into large scale production. However, it is shown that even the worst combination of these materials will produce a hydraulic oil that is approximately the same viscosity as the present specification 3580 oil at 150°F. but has a viscosity of only 1000 at -40°F. as compared to 7000 for the present 3580 oil. The best combination will reduce the viscosity at -40°F. to approximately 500. It is also shown in this report that there are certain non-hydrocarbon hydraulic oils which, while not as good from a temperature-viscosity angle as the hydrocarbon ones, are nevertheless vastly superior to the usual 3586 type used in certain aircraft installations. It was planned to submit samples of this oil to the services for test. The next part of this program was stated to be the study of production methods and operational tests. Report number four (PB 23212) presents the conclusions of one year's work. Early in the work of the NDRC committee, an urgent requirement became apparent for a petroleum hydraulic oil suitable for aircraft hydraulic systems which would permit considerably improved operation of the aircraft under the low temperatures obtained at high altitudes. For this reason the other portions of their work, namely, the development of recoil oils and the development of non-hydrocarbon hydraulic oils had been minimized. At the end of one year the sub-Section's recommendations on this problem as they related to the immediate problem of hydraulic oils were brought to a definite conclusion. This report indicates that it is feasible to produce by commercial operations a hydraulic fluid that is thirty times as fluid at -50°F. as the present hydraulic oil and yet is just as viscous at 150°F. as the present product. This new product can have a pour point well below -70°F. Commercial methods for the preparation of this fluid are disclosed. They indicate that it should be made from a narrow distillation cut of petroleum suitably treated to be compatible with synthetic rubber gaskets in the hydraulic system. The product may be made from either paraffinic or naphthenic crudes, thus indicating that the supply of base stock is not limited to any small group of base stock it has been found necessary to add an additive, and two forms of additives are shown to be suitable. One of these is the polybutene type similar to that used in the present hydraulic oils, and the other is a new form of Acryloid. It was the consensus of opinion of both the committee members and the representatives of the armed forces that steps should be taken immediately to set up specifications covering such improved hydraulic oils. Samples from pilot plant operation covering several variations have been submitted to the services for test. This report was labeled as a final report but the contract for the experimental work had been renewed before this report was made. Report number five (PB 23213) is the first report of the NDRC section which had been B-7-A at the time the project was undertaken in 1941 and became B-8-C with the renewal of the contract. On the basis of the test results of the samples of fluids supplied to the armed services, specifications were drafted for procurement of the improved aircraft hydraulic fluid. Several petroleum companies indicated their ability to supply the desired petroleum base stock. Polybutene was available in large quantity and facilities were under consideration for the production of Acryloid. Samples of Navy hydraulic and Artillery recoil fluids were also supplied to the respective ordnance sections of these services. The results of their tests indicated that some improvement in viscosity and reduced viscosity loss or polymer breakdown might be necessary. These changes should not be difficult to make and the improved samples will be released shortly. It appeared entirely possible to use the same petroleum base stock in all three fluids by varying the type and amount of viscosity increasing polymer to obtain the desired viscosity ranges. If a more viscous base is required for the

recoil or Navy fluids it is stated in this report that this can readily be obtained by adding conventional, low cold test transformer oil to the special hydraulic oil test base stock. Further work on these fluids will include viscosity break-down, oxidation and rubber swelling studies as well as modification of the characteristics of the fluid as indicated to be necessary by the results of the Army Ordnance and Navy Bureau of Ordnance tests. Although the Air Corps and Bureau of Aeronautics are standardizing on mineral oil hydraulic fluids and synthetic rubber gaskets, work on non-hydrocarbon fluids is being continued since this field offers the possibility of developing an outstanding all-purpose fluid compatible with petroleum and natural and synthetic rubber. Several promising non-hydrocarbon fluids are being investigated in detail and the material has been sent to the Material Command for hydraulic pump tests. The organosilicates which possess extremely flat viscosity temperature curves need further modification since the available products are deficient in lubricating ability, and attempts to test them have resulted in equipment failure. When the sixth report was completed it could be announced that the NDRC committee had assisted the Army and Navy in setting up specification AN-VV-O-366a, effective Aug 6, 1942, covering petroleum base aircraft hydraulic oils. Commercial production of these oils started late in Aug 1942 and deliveries were made to the Army Air Forces the first week in September for use in northern areas during the winter. Likewise the committee had assisted the Army Ordnance Department in the preparation of tentative specification AXS-806 effective Sep 29, 1942 covering petroleum base recoil oils. The work on the Navy hydraulic oils, which was the third of the objectives, was well under way and it was hoped that specifications and commercial production could be accomplished before the end of the year. The Navy, however, was not anticipating the installation of the oil in their ships that winter. The committee was working closely with the Navy Bureau of Ships and Ordnance in an attempt to finalize the specifications for the Navy hydraulic oil. Service data from the military forces and equipment manufacturers were becoming available. Some of the problems to be considered included tackiness of evaporated films of the hydraulic oil, the question of the lubricating quality of the oil and its effect upon wear of moving parts and finally the problem of foaming and vapor locks. Little work was done during this period on non-hydrocarbon oils but the problems were kept in mind. A more recent question had to do with non-inflammable hydraulic oils for aircraft. Military personnel did not recommend an extended program on this problem but some work was planned for this field. A consideration of the base stocks needed for the various fluids had led to the conclusion that ample quantities could be made in a fairly straightforward manner. It was suggested that a survey of raw materials and refining equipment should be made in the event that accelerated or changed plans should increase the demands. In Progress Report 7 (PB 22479) it was stated that over 750,000 gallons of oil meeting the specification for the Aircraft hydraulic fluid had already been delivered to the Army Air Force. This material had been extensively tested during the winter maneuvers in Alaska and proved highly satisfactory. At the time of this report indications were that the requirement for this fluid might reach 13,000,000 gallons a year. This was several times higher than any previous estimates and it was realized that it might necessitate increasing the supply of critical materials. At that time the production of Acryloid polymer was only sufficient for 3,500,000 gallons of fluid per year and an increased demand for that amount would necessitate the construction of additional plant facilities or the diverting of plant capacity from Lucite to Acryloid polymers. The specifications for the Navy Hydraulic gun oil had been issued very shortly before the publication of report 7. This oil was for use in gun control equipment on warships. Experimental samples had been extensively tested by the Naval Gun Factory and it was hoped that supplies would soon be available. The specification for the recoil oil for the Army Ordnance Department was likewise issued in the year before this report and at the time of the report over 100,000 gallons of this product had been manufactured. This oil also had been extensively tested during winter maneuvers in Canada and was found to perform very satisfactorily. Volume requirements for this product were not large, and the 100,000 gallons already produced would take care of a large part of the change-over for guns on hand to the new oil. Oil for new production would be of approximately the same order of magnitude. In the 8th report (PB 22484) it was announced that the Aircraft hydraulic fluid specification had undergone a second revision. Development work for the aircraft hydraulic fluids continued mainly along the lines of studies of materials which lower the vapor pressure and are suitable as anti-tacks and anti-rusts, as well as studies of rubber swelling as measured by the aniline point of the fluids. It was determined that a low aniline point was in itself not indicative of rubber swelling unless the aniline point undergoes considerable change when the fluid is in use. Attention had also been given to the matter of foaming. Preliminary experiments had been made to establish a method for making comparative measurements of foaming by the use of a photo-electric cell which is placed to one side and just above the liquid level of the fluid which is stirred at reduced pressure in a test container. An estimate has been made of the availability of the Acryloid type polymers used in the fabrication of the hydraulic fluids. By using polymers of the same general type as the one originally specified, it will be possible to meet any demand anticipated at this time, without impairing the properties of the fluids. The tentative Navy specification O.S. 2943 for Navy hydraulic oil which had been completed was given in this report. An effort was made to make this specification have as many properties in common with O.S. 1113 as is feasible, thus lowering the number of different types of components necessary for manufacture. The specification AXS-806 for recoil oil had also been revised. Considerable time had been spent in the preparation of fluids for special purposes such as gyroscope damping and compass fluids. Although these fluids differ considerably from the types of fluids originally studied, the same principle has been applied, namely, a choice of a suitable base stock and the addition of a specified amount of polymer additive. Report 9 (PB 22469) continues the work on these various oils with special emphasis on the use of these fluids and the characteristics of the ingredients used in them. Report 10 (PB 22474) includes a rather complete discussion of aircraft hydraulic oils together with suggestions for the various services to consider with regard to modifying the current specification. Further development work was carried out on the Navy hydraulic oils OS-113 and OS-2943. These oils had proved satisfactory in the field although certain operating difficulties had been encountered with some batches. Solutions to these difficulties are discussed in this report. The work on the Army recoil oil was fairly well stabilized at this time and only a small amount of work studying its lubricating properties had been carried out during this period. This oil appeared to be eminently suitable in operation. A large amount of work had been done on possible non-inflammable hydraulic oils including some very interesting developments on water base fluids with special thickeners for improving the viscosity-temperature characteristics. Further work had also been done on determining the utility of silicone oils for hydraulic purposes. Report 11(PB 22478) is the final report under this contract. It gives the final results of the work relating to the development of improved hydraulic, recoil, and special oils. As a direct result of this work the following specifications for hydraulic and recoil oils have been issued: Navy Ordnance O. S. 2943 and O. S. 1113-D; Army-Navy AN-VV-O-366b; Army Ordnance AXS-806; Canadian 36F12; and British Ministry of Aircraft D.T.D.-585. The work is being continued and supported by the Navy Bureau of Ordnance and the Army Air Forces, as outlined at the end of the report. The work done under this contract related not only to the chemistry of the various materials that comprise these special fluids and lubricants, but was also concerned with various physical and mechanical items, such as the performance of hydraulic equipment, lubrication, and leakage. There is also a considerable amount of information on water-base fluids which are of particular interest because they are less inflammable than the fluids in current use. All reports are accompanied by various types of illustrative material. Photographs, charts, graphs, diagrams, specifications, and special reports are appended. Test data are presented in tabular form. Report 11 contains a publication of the Petroleum Refining Laboratory, entitled "Apparatus and procedure for the determination of low-temperature kinematic viscosities" (inserted between pages 172 and 173). There are also included in the regular paging of the volume

nine sections which contain title pages and special numbers. These are: Report no. PRL 106.9 "The use of Cetane-Decalin mixtures as standard reference fluids for controlling rubber swelling in hydraulic oils"; PRL 106.11 "Preparation and evaluation of specification AN-VV-O-366b fluids with improved tackiness characteristics"; PRL 3.3 "Proposed revision of specification AN-VV-O-366b oxidation stability and corrosion test; PRL 101.6 "Swelling of aircraft hydraulic brake expander tubes"; PRL 3.4 Preparation of specification O.S. 2943 hydraulic fluids with improved tackiness characteristics; PRL 3.1 "The development and use of a hydraulic system cleaning fluid"; PRL 3.2 "Effect of tectyl preservative compounds on hydraulic gear fluids and rubber seals"; PRL 104.7 "The development of viscous damping fluids with improved viscosity shear characteristics"; PRL 3.12 "Some preliminary studies of the suitability of Tri-N-Butyl phosphate as a base stock for hydraulic fluids and lubricants".

INSTRUMENTS (PROFESSIONAL, SCIENTIFIC AND CONTROLLING)

German

PB 22944. FOSTER, L. V. and others. German optical industry. (Naval Tech Mission in Europe Tech Rept 471-45) Sep 1945. 10 p. Price: Microfilm-50¢ - Photostat-$1.00
This report contains an enumeration and brief description of machines and processes peculiar to the optical industry either as seen or described to this mission during four weeks of investigation in Germany. The only machines and processes included are those which were thought to be sufficiently different from those in common use in the United States to warrant a description. The information is given under the headings: 1) Diamond milling of lenses and prisms in German optical industries; 2) roof prism manufacture; 3) polishing; 4) lens centering machines; 5) metal working machinery; 6) reticle manufacturing; 7) optical inspection; 8) lens coating; 9) glass manufacture; and 10) synthetic materials. This report cannot be considered as all inclusive, since one of the most important firms, Carl Zeiss, was not available for investigation.

PB 22375. JACKSON, L. R. and others. Examination of enemy materiel (OD-113; AC-77): Metallurgical examination of German mechanical and electrical aircraft tachometers. Progress report 130, Oct 5, 1944. (OSRD Rept 4360. War Metallurgy Committee Rept M-412). Nov 1944. 22 p. Price: Microfilm-50¢ - Photostat-$2.00
Examination of these German tachometers at Battelle Memorial Institute showed that most parts of the electrical tachometer were molded from resins of the phenolformaldehyde type. The ferrous portions of this instrument were silicon steel transformer sheet riveted together in laminated sections and low-alloy chromium steel pivots. The hair spring was made of phosphor bronze and had been covered with a gold plating which was 10% by weight of the total spring. The mechanical tachometer was made principally of steel bar stock and aluminum castings and extrusions. The steel sections were gears and shafting made of a low-carbon, high sulfur steel equivalent to SAE X1112, and high-carbon, chromium ball bearing steel. The electrical tachometer was jewelled; the mechanical was not. Included are discussions of the results of the examination and economic considerations relative to manufacture of these instruments, photographs and tabulated data.

PB 17382. KÖRNER. Besprechung am 19.8 1942 in Frankfurt/Main über drehzahlanzeiger nach dem prinzip des hysterese-motors. (Discussion on Aug 19, 1942 in Frankfurt/Main on electric meters on the principles of the hysteresis-motor). (MIS VII 87d 7000787) Aug 1942. 2 p. Price: Microfilm-50¢ - Photostat-$1.00
Report to Hartmann and Braun, Frankfurt am Main, electric-meter manufacturers, on a new speedometer (indicator of number of revolutions) to be built by Stots Apparatebau, Eberbach, on the principles of the hysteresis-motor, for aeronautical purposes. Details are given.

PB 19742. U. S. THIRD ARMY. SIGNAL SECTION. German capacity meter "Kapazitätsmesser 40". (Enemy Equipment Intelligence Service Rept 8-49.) Jul 1945. 11 p. Price: Microfilm-50¢ - Photostat-$1.00
This captured German capacity meter is designed to measure the distributed capacity of single pair wire and spiral 4. It was manufactured by Siemens in 1940. Diagrams, photographs, and operating instructions are appended.

United States

PB 21132. BARBER-COLMAN COMPANY, ROCKFORD, ILL. A dynamic tester for antiaircraft directors: Final report. (NDRC Rept 7-135) Sep 1945. 69 p. Price: Microfilm-$1.00 - Photostat-$5.00
This report is a summary of work conducted by Barber-Colman Company between October 1941 and September 1945 on the study and investigation in connection with equipment for dynamically testing antiaircraft directors. The work consisted of development of a dynamic director tester that enabled a course simulating that of an aircraft to be fed, either mechanically or electrically, into a director and the error in director computation plotted continuously throughout the course. It is also possible to compute automatically the time integral of the director errors or the rms value of the error. Cams were cut that contained perturbations which were typical of various radar and optical tracking devices. The complete description and operating instructions for the tester are given in the appendix of this report. The data is interpreted in tables, graphs, diagrams, and photographs.

PB 20507. FERNBACH, SIDNEY. The speedomax maximum pressure recorder: Final report. (Frankford Arsenal Ordnance Lab Rept R-186) May 1942. 16 p. Price: Microfilm-50¢ - Photostat-$2.00
This report describes an instrument which was developed by the Bell Telephone Laboratories and built by the Western Electric Company into a Leeds and Northrup Speedomax Recorder. The instrument makes use of piezo gauge to record maximum pressures. These pressures differ by less than 800 p.s.i., on the average, from those measured on the Cathode Ray Oscillograph, provided fiber washers are used under the piston head. The advantages of piezo gauge over coppers for determining pressure make it desirable to use the gauge in conjunction with an instrument which will rapidly record maximum pressures. The equipment contains a power supply, amplifier, and calibrating circuit operating in conjunction with the Speedomax recording device. All records are made permanently on a roll of chart paper which reads directly in pounds per square inch. Pressures can be read off either the chart paper or scale immediately above it just an instant after firing. The calibration requires but a few seconds provided the gauge constant is known. The results of a series of check firings made simultaneously by the Cathode Ray Oscillograph and Peak Pressure Recorder are recorded in tabular form. Diagrams, curves, and photographs appear in the appendix.

PB 18805. HAREMLAND, E. R. A direct reading electronic phase meter. n.d. 1 p. Price: Microfilm-50¢ - Photostat-$1.00
A very brief description of a direct reading electronic phase meter designed to read the electrical phase angle between two sinusoidal voltages or currents of the same frequency within the range from 10 to 5000 cps.

PB 22093. HODGE, A. H. Calibration of the Aberdeen Proving Ground frequency standards. (Aberdeen Proving Ground Ballistic Res Lab Rept 8). May 1938. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
This report describes the methods that have been used to calibrate the tuning forks of the Aberdeen Proving Ground. The method used at the present time consists of comparing the frequency of the forks with a modulation frequency which is emitted by radio from the National Bureau of Standards. Vibrating forks are the most convenient means of providing timing of the phenomena which are investigated by the use of

various chronographs. The forks are vacuum tube driven, and arrangements are made to cut off the driving tube while measurements are being made.

PB 22095. KENT, R. H. Precision of the Boulengé and Solenoid chronographs. (Aberdeen Proving Ground Ballistic Res Lab Rept 24). Jan 1935. 22 p. Price: Microfilm-50¢ - Photostat-$2.00
In connection with results which were obtained with the 37mm and 16" guns the question was raised as to the relative reliability of the Boulengé and Solenoid chronographs. Results were obtained from various firings and calibrations and an estimate was made of the determinate and indeterminate errors of the Solenoid and Boulengé chronographs. It was shown on the average that the determinate error of the Boulengé chronograph amounted to approximately 5 f/s and under ordinary conditions the indeterminate errors amounted to a little over 1 f/s. In the case of the Solenoid chronograph the determinate error depended only upon the variation in the rate of the tuning fork, and that was shown to be very small. With the arrangements made for driving the tuning fork it should be much smaller than it has been in the past. On the basis of a distance of 100 feet between screens and a velocity of 2000 f/s it was shown that the indeterminate error of the Solenoid chronograph was about 1/10 f/s, when a 75 mm projectile was used. With smaller projectiles such as the 37 mm the error was somewhat greater. A recommendation was made that the Boulengé should not be depended upon in any important firings except as an approximate check for the Solenoid velocities. Tables, graphs, wiring diagrams, and photographs illustrate the report.

PB 16801. MOORES, C. W. Transient-peak voltmeter type 4A, theory and operation. (Naval Ordnance Lab Rept 1011) Sept 1945. 16 p. Price: Microfilm-50¢ - Photostat-$2.00
The NOL Transient-Peak Voltmeter type 4A is a precision, vacuum-tube instrument which will measure negative transients of 5 volts maximum rising to the peak in not less than 10 milliseconds. By using an external meter or potentiometer to read the output, an accuracy of 0.5% can be maintained. To achieve this accuracy, a new circuit which employs feedback across the peak-reading diode is used. Instructions for the adjustment and operation of this instrument are given, with diagrams and charts.

PB 22222. U. S. WAR DEPARTMENT. Barometers ML-102-B, ML-102-D, ML-102-E, ML-102-F, and ML-316/TM. (Tech Manual 11-427). Nov 1944. 35 p. Price: Microfilm-50¢ - Photostat-$3.00
The barometers described in this manual are aneroid-type barometers used to measure the pressure of the atmosphere. The greatest advantage of the aneroid is its portability. It is widely used where the use of the mercury barometer would be inconvenient or impractical. It is also valuable in giving relative indications and in measuring pressure changes over a few hours. Apart from the measurement of pressure, there is a broad field for the use of the aneroid barometer in determining height above sea level or above the ground, and in determining differences in elevation between two points. When used to measure height, the aneroid is called an altimeter. Altimeters are widely used in aircraft and in surveying. This manual contains sections covering description, installation and operation, functioning of parts and maintenance, including maintenance parts list. Photographs and nomograph are included.

PB 22087. U. S. WAR DEPARTMENT. Converter M-209, M-209-A, M-209-B; cipher. (Tech Manual 11-380). Mar 17, 1944. 66 p. Price: Microfilm-$1.00 - Photostat-$5.00
Subject converters are small, compact, hand-operated tape-printing, mechanical devices designed for rapid enciphering and deciphering of tactical messages. When properly set and operated, they will encipher a plain text message of any length, automatically printing the enciphered text on a paper tape in 5-letter groups; or they will decipher a message that has been previously cryptographed by another subject converter, printing the clear text on a paper tape with proper spacing between words. This manual contains description and instructions for installation, operation and maintenance. A tabulated list of replaceable parts is given. Appendix I presents information on preparation of pin and lug settings, and appendix II presents sets of numbers and overlaps for lug settings. Photographs are included.

PB 22366. U. S. WAR DEPARTMENT. Oscilloscope I-345-B. (Tech Manual 11-2689). Apr 1945. 61 p. Price: Microfilm-$1.00 - Photostat-$5.00
This is the Dumont type 208-B cathode-ray oscilloscope. It is used for viewing waveforms and checking frequencies and phase relations at various test points in radio and radar sets. It consists of a cathode-ray tube using electrostatic focusing and deflection and connected in a conventional cathode-ray oscilloscope circuit. A linear sweep or timebase is generated internally. The amplitude and frequency of the sweep is variable. Different types of synchronizing signals with varying amplitudes may be applied. This manual gives instructions for operation, maintenance, and repair. It is illustrated with photographs and diagrams.

PB 21930. U. S. WAR DEPARTMENT. Plotting set AN/GMQ-3. (Tech Manual 11-2418) Nov 27, 1944. 87 p. Price: Microfilm-50¢ - Photostat-$3.00
The plotting set described in this manual consists of meteorological plotting equipment used to graphically compute and plot to scale winds aloft, using data obtained from radar balloon soundings. Instructions for installation, assembly, and operation of the equipment are given. Photographs, charts and drawings illustrate the manual.

PB 22252. U. S. WAR DEPARTMENT. Psychrometric calculator ML-322/UM. (Tech Manual 11-2422). Mar 24, 1945. 32 p. Price: Microfilm-50¢ - Photostat-$3.00
Subject calculator is a circular slide-rule device which is used primarily to compute relative humidity, dew point, and vapor pressure, from observed values of dry- and wet-bulb temperatures and atmospheric pressure. The calculator, when used with aircraft humidity-measuring devices, is also designed to correct the indicated values of humidity for the dynamic effects of air speed. It reduces the arithmetic involved in using psychrometric tables or in applying psychrometric formula to psychrometric data. This manual presents description, operating instructions, preventive maintenance techniques and items, repair instructions, references and glossary. Photographs of calculator included may not reproduce well.

PB 21892. U. S. WAR DEPARTMENT. Static direction finder AN/GRD-1. (Tech Manual 11-2696) Mar 1945. 48 p. Price: Microfilm-50¢ - Photostat-$4.00
This weather direction finding equipment is an adaption of direction finding principles to the end that the direction from an observer to an electrical discharge can be measured accurately. If two such observations are made, the position of the discharge may then be determined by triangulation methods. The equipment is capable of detecting atmospheric discharges, or "sferics," which occur at distances up to several thousand miles from the observer. This equipment consists basically of a loop antenna, an amplifier, and a cathode ray tube. This manual, prepared by the War Research Laboratory, University of Florida, contains general information, operating instructions and maintenance hints for the equipment. Circuit diagrams and photographs are included.

PB 22077. U. S. WAR DEPARTMENT. Thermometers ML-4 and ML-5, psychrometers ML-94 and ML-234, shelters ML-41, ML-41-A, and ML-41-B. (Tech Manual 11-2417). Mar 17, 1945. 44 p. Price: Microfilm-50¢ - Photostat-$4.00
This manual covers certain meteorological instruments to be used for surface measurement of atmospheric temperature and humidity, and a shelter in which the instruments may be housed. Thermometer ML-4 (the maximum thermometer) is used to provide an indication of the highest air temperature that has occurred at a given station within a specified time. Thermometer ML-5

(the minimum thermometer) is used to indicate the lowest air temperature that has occurred at a given station within a specified time. Both are issued in temperature ranges for general, tropical and arctic use. The psychrometer consists of two identical mercury thermometers, one of which (the dry-bulb) is used to measure the temperature of the free air, and the other (the wet-bulb), to provide a measurement of the water vapor content of the air. From such data, the relative humidity, the dew point, and the vapor pressure of the atmosphere may be evaluated. Manual includes description of items, and instructions for installation, assembly, and operation, preventive maintenance and repairs. A sample unsatisfactory equipment report has been filled out. Appendix contains list of maintenance parts. Photographs and drawings are included. This manual supersedes TB Sig 76, Aug 11, 1944 and TB Sig 107, Oct 21, 1944.

PB 21956. U. S. WAR DEPARTMENT. SIGNAL CORPS. Clinometers ML-119-C, ML-119-D, ML-119-E, and ML-119-F. (Tech Manual 11-2433) Jan 1945. 27 p. Price: Microfilm-50¢ - Photostat-$2.00
The manual describes the clinometer, used to measure an angle of elevation, and gives instructions for installation, assembly, operation, maintenance and repair of the equipment. The appendix contains a table of elevation angles, tangents, cosines and ceiling heights. Photographs illustrate the text.

PB 21944. U. S. WAR DEPARTMENT. SIGNAL CORPS. Echo box TS-207/UP. (Tech Manual 11-1212) Dec 1944. 37 p. Price: Microfilm-50¢ - Photostat-$3.00
The echo box is a resonant-cavity device designed to simplify the tuning and checking of radar equipment in that it (1) provides an artificial or phantom target which may be used in tuning the receiver to the transmitter if no real targets are available (2) provides a clear steady echo of known characteristics when such an echo is not obtainable from near-by ground targets. It may be used for many testing procedures. The components on the echo box vary in electrical characteristics according to the radar set with which it is to be used. Instructions are given for the preparation, installation, operation, maintenance and repair of the set and its components. Photographs, diagrams, charts, graphs, and tables are included.

PB 21965. U. S. WAR DEPARTMENT. SIGNAL CORPS. Echo box TS-280/TPS-3. (Tech Manual 11-1083) Apr 1945. 19 p. Price: Microfilm-50¢ - Photostat-$2.00
This is a test instrument for checking the over-all system performance and tuning the radio-frequency system of radar sets operating at a frequency close to 600 megacycles. It is designed primarily for use with Radio Set AN/TPS-3. It consists of a resonant cavity contained in a plywood case, with a cable and probe. The description is followed by instructions for preparation of the box for use, and for the operation, maintenance and repair of the echo box. Photographs, charts, tables, and a parts list are included.

PB 21955. U. S. WAR DEPARTMENT. SIGNAL CORPS. Electronic volt-ohmmeter, Radio City Products model 664. (Tech Manual 11-2624) Oct 1944. 21 p. Price: Microfilm-50¢ - Photostat-$2.00
This instrument is a sensitive volt-ohmmeter which can be used to measure a-c and d-c voltages as well as resistance over a wide range, but cannot, however, be used to measure current. The d-c voltage range is 0.05 volts to 1,000 volts; the a-c range is 0.25 volts to 1,000 volts, and the resistance range is 1/10 ohms to 1,000 megohms. A full description of the instrument is followed by instructions for its installation, operation, and maintenance. Photographs, diagrams, charts, and a parts list are included.

PB 18390. U. S. WAR DEPARTMENT. SIGNAL CORPS. Preliminary instructions for 19C (SPL) oscillator PER D-166636 (Moisture-resistant). (Manufactured by Western Electric Co., New York, N. Y.) (L-66232, Issue 2) Apr 1944. 33 p. Price: Microfilm-50¢ - Photostat-$3.00
This manual presents a description of the 19C (SPL) Oscillator with information on its employment, the functioning of its parts, and instructions for its maintenance. It is a heterodyne-type vacuum tube oscillator which provides a source of testing current for transmission measurements. It is capable of supplying an output from -4 dbm to + 6 dbm over a frequency range from 30 cycles to 15 kilocycles. Diagrams, tables, photographs.

PB 21963. U. S. WAR DEPARTMENT. SIGNAL CORPS. Radio modulator BC-423-B. (Tech Manual 11-2636) Nov 1944. 25 p. Price: Microfilm-50¢ - Photostat-$2.00
This modulator or tweeter is a miniature keying unit, modulator, and transmitter combined, which may be used for determining receiver-antenna patterns, and for lining up the various receiving antennas of the radio set, or under some conditions, it may be used for orientation. It consists of the two main units, the audio frequency oscillator and the radio frequency oscillator, and a power supply. The tweeter radiates a 205 mc. wave modulated by pulses occurring at a frequency of 4,096 cycles. The signal is then used at the receiver for the desired testing. Instructions are given for the installation, operation and maintenance of the modulator. Photographs, diagrams, charts, tables, and a parts list are included.

PB 21148. U. S. WAR DEPARTMENT. SIGNAL CORPS. Repair and calibration of electrical measuring instruments. (Tech Manual 11-472) Dec 1944. 77 p. Available from Supt. Documents, Washington 25, D.C. Price: 20¢
Fundamental principles of magnetism and the operation of electrical measuring instruments precede instructions for meter maintenance, adjustment and calibration and a section on maintenance equipment. This includes a meter test equipment designed to provide complete self-contained facilities for testing and calibration of indicating instruments in Signal Corps communications and electronic equipment. A list of its major components and circuit analyses of its voltage supply is followed by instructions for its preparation and operation. A Wheatstone Bridge, and ohmmeters for resistance measurements, magnet chargers, demagnetization, and small repair tools are taken up. Moistureproofing and fungiproofing and other miscellaneous information including definitions, abbreviations and metric prefixes and electric symbols, are also given. Photographs, charts, diagrams and tables are included.

PB 21947. U. S. WAR DEPARTMENT. SIGNAL CORPS. Signal generator I-137-B; W.I.T. model 43-41. (Tech Manual 11-2641) Jan 1945. 48 p. Price: Microfilm-50¢ - Photostat-$4.00
This is a self-contained calibrated radio-frequency generator with a fundamental range of 5 to 175 megacycles, with or without amplitude modulation. The principal purpose of this unit is to provide a source of radio frequency voltage for use in aligning, calibrating and measuring the sensitivity of certain amplitude- modulated types of fixed mobile, or airborne radar and communication receiving equipment. Instructions are given for its installation, operation and maintenance. Photographs, charts, diagrams, tables and a parts list are included.

PB 21943. U. S. WAR DEPARTMENT. SIGNAL CORPS. Test set AN/GPM-1. (Tech Manual 11-1061) Nov 1944. 67 p. Price: Microfilm-$1.00 - Photostat-$5.00
This manual gives installation and operating and maintenance instructions as well as general and detailed descriptions of this special test equipment for Radio Sets SCR-268-A, SCR-268-B, and SCR-268-C and for radio equipment RC-148. When used in conjunction with Test Set AN/GPM-1, all equipment necessary for third echelon maintenance will be available. It is carried in a wooden chest mounted on a shock-mounted base in the center of the van. The power for operating can be obtained either from Power Unit PE-95, from a commercial source, or 6-volt, 12-volt and 24-volt d-c power supplied by batteries located in the front of the van. Parts list, photographs, drawings, connections and schematic diagrams are included.

PB 21982. U. S. WAR DEPARTMENT. SIGNAL CORPS. Test set AN/MPM-4. (Tech Manual 11-1222) Mar 1945. 17 p. Price: Microfilm-50¢ - Photostat-$2.00
This test set consists of two calibrators and a signal generator, enclosed in a wooden chest mounted on a shock mounted base, and is used in the maintenance of Radio Set SCR-296-A. The calibrators provide a means of checking and calibrating the range unit, and for setting and checking the modulator generator or keyer oscillator frequency, and the signal generator provides the correct signal voltage for aligning and calibrating the receiver unit. A list of additional Technical Manuals giving installation and operation of the components is included. General information only on the functions and maintenance of the components is given in this manual. Photographs, table of components, and capacitor and resistor color code tables are given.

PB 21950. U. S. WAR DEPARTMENT. SIGNAL CORPS. Test set I-48-B. (Tech Manual 11-2050) Oct 1944. 18 p. Price: Microfilm-50¢ - Photostat-$2.00
This set is a portable insulation resistance test set for checking insulation resistance of cables, between conductors of multiple cables, between windings and windings to ground in transformers, between windings and windings to frame in rotating equipment, and for other equipment where insulation resistance is an important factor. A description giving difference in models, is followed by instructions for the installation, operation and maintenance of the equipment. Photographs, diagrams, and tables are included. It consists of a high-range ohmmeter of special design mounted in the same case with a hand-operated direct current generator.

PB 21946. U. S. WAR DEPARTMENT. SIGNAL CORPS. Test unit I-236. (Tech Manual 11-2056) Jan 1945. 37 p. Price: Microfilm-50¢ - Photostat-$3.00
This is a portable self-contained test instrument designed primarily for use in testing teletypewriter equipment, to check continuity of circuits, to differentiate between a-c and d-c voltages, to check fuses and to test capacitors. The power input is 115 to 130 volts, a-c or d-c. The unit is housed in a steel case with space for the test leads and spare lamps. Instructions are given for the installation and assembly, operation, maintenance and repair of the test unit. Photographs, diagrams, tables and a parts list are included.

PB 22084. VINTI, JOHN P. Some developments in the theory of the solenoid chronograph. (Aberdeen Proving Ground Ballistic Res Lab Rept 271). Mar 1942. 33 p. Price: Microfilm-50¢ - Photostat-$3.00
The theory of the solenoid chronograph was developed by R.H. Kent in 1927. From his treatment it was concluded that, for the inductive circuit consisting of coils, line and terminating resistor, the lag of the zero of the current behind that of the e.m.f. is equal to the inductive time constant L/R provided that L/R is sufficiently small. If L/R is sufficiently small, the lag is independent of the eccentricity of the shot, so that no error is introduced by the circuit. Kent treats by numerical integration the test case of a 3.3" projectile going through a 20" solenoid. From the numerical integrations he then tabulates the differential lag between central and eccentric shots vs. time constant L/R for value and L/R from 1 to 5 second and a velocity of 1 inch per second, and shows how to translate these results to actual velocities and time constants. It is the purpose of this report to develop a method free from the restriction to the test case above used. With this new method a universal graph may be used to reach the lag for any projectile going through any solenoid, once the e.m.f. curve is known, or rather one single parameter deducible from it. The new method may also be used to treat the response of a capacitative circuit to the solenoid e.m.f. Knowledge of such a response is desired in treating the effect on the signal of a linear amplifier, that is an amplifier free from amplitude distortion. Equations, tables, and curves constitute the major portion of the report.

MACHINERY (EXCEPT ELECTRICAL)

German

PB 18316. ALLGEMEINE ELEKTRICITÄTS-GESELLSCHAFT. Elektrowerkzeuge (Electro tools) (MIS VII 698 17 7001210) 1940-1943. 26 p. Price: Microfilm - 50¢ - Photostat - $2.00
This publication contains catalogues of various kinds of electrical tools as hand-drills, drill presses, grinders and hammers. The equipments are described as to their performance and price. The catalogue is illustrated with photographs. In German.

PB 18274. AMSLER-MORTON G.M.B.H., BERLIN. Technical drawings of equipment. (MIS VII 66 b10 7002068) n.d. 16 p. Price: Microfilm - 50¢ - Photostat - $2.00
This material consists of sixteen technical German drawings covering annealing furnaces and glass pot furnaces. Included are assembly drawings, foundation and plan drawings, steel construction drawings, and sectional drawings. Two additional drawings cover steel car construction for annealing furnace and one drawing is for a heating furnace for five workshops.

PB 18275. BANDEISENWALZWERKE A. G., DINSLAKEN. Interior photos of metal rolling mill experimental station. (MIS VII 66b 10 7002090) n. d. 12 p. Price: Microfilm-50¢ - Photostat-$1.00
This material consists of twelve interior photographs showing machinery and equipment in a German rolling-mill located in Dinslaken.

PB 14592. BENSINGER, W. D. Einzylinderprüfanlagen (Reichsluftfahrtministerium, Ringbuch der Luftfahrttechnik III B 5) (ALSOS Mission, Klotter File 11 C) Feb 10, 1938. 13 p. Price: Microfilm-50¢ - Photostat-$1.00
This report, one of a series of pamphlets published by the German Air Ministry, describes a number of one cylinder test engines used for aeronautical research and engine development. The DVL test engine is described in detail. Three other one cylinder test engines are also described, one of these being an American model manufactured by the Waukesha Motor Co. The report contains drawings, photographs, and a bibliography.

PB 19403. DELMAG, MASCHINENFABRIK, ESSLINGEN. Der 500 kilogramm frosch (The 500 Kg press). n. d. 34 p. Price: Microfilm-50¢ - Photostat-$3.00
This material consists of 19 German assembly drawing for a 500 kg press.

PB 19404. DELMAG MASCHINENFABRIK, ESSLINGEN. Die 100 kilogram ramme. (The 100 kilogram ram). Apr 15, 1946. 10 p. Price: Microfilm-50¢ - Photostat-$1.00
This material consists of manufacturing drawings for a 100 Kg. ram. The drawings were made by Delmag Maschinenfabrik, located at Esslingen, Germany. The following drawings are included: Detailed drawing of cylinder head, suction pipe, cylinder, cylinder sleeve with cooling ribs, piston and details, vaporizer cover, detail drawing of vaporizer, vaporizer general, and working tools and equipment.

PB 19405. DELMAG, MASCHINENFABRIK, ESSLINGEN. Dieselramme 500 kilogram schlagerstaubung (Diesel rammer - 500 Kg crushing power). n. d. 184 p. Price: Microfilm-$2.00 - Photostat-$13.00
This material consists of 156 German detail drawings for a Diesel rammer having 500 Kg. crushing power.

PB 17690. MEISSNER, J. SIEGEN. Füllanlage maschines. (Filling plant machines). (MIS 67g 7001885) n.d. 43 p. Price: Microfilm-50¢ - Photostat-$3.00

This material consists of a number of German drawings, sketches, and layouts covering machinery and equipment for filling plants. There are more than 20 drawings covering equipment for filling shell casings 7.5 - 10-5 and 15 cm., one layout for an ammonium nitrate drying plant, a flow sheet for the casings through to various operations, assembly drawings of eleven different machines covering the filling operations for the casings, and a drawing showing all operations from the arrival of the empty shell casings to the loading of the completed shells in freight cars. There is layout of a heating equipment for sixteen bottles, sketch of a transport can, a filling funnel, a mixing drum, water purifying equipment, a mixing kettle, feeding drum for mixing kettle, water spout, and a sketch of testing equipment.

PB 18282. A. WAGENBACH & CIE., WUPPERTAL-ELBERFELD. The "Futura" iron working machines. (MIS VII 68 b 10 700416) Nov 1940. 22 p. Price: Microfilm - 50¢ - Photostat - $2.00
This report consists of a letter from A.Wagenbach & Cie, at Elberfeld, Germany dated Nov 1, 1940 to Herr Kasen, Armament Command, Düsseldorf with inclosures as follows: (1) Two reports from Kaiser-Wilhelm Institut für Eisenforschung giving results on bending and stretching tests on steel bars submitted; (2) a drawing showing old and reconstructed bending machine; (3) a Futura folder illustrating bending and shearing machines, (4) a drawing showing new type rollers for the bending machine; (5) three illustrations showing improved bending mechanism; (6) and a copy of Der Deutsche Techniker, Aug 1940, which includes under patent announcements, an article describing the new bending machine.

PB 22939. WERNISCH, GEORGE R. Gantry crane re-directional mechanism. (Naval Tech Mission in Europe Tech Rept 431-45) Sep 1945. 9 p. Price: Microfilm-50¢ - Photostat-$1.00
This report gives information obtained on an inspection trip for the purpose of studying and reporting on this mechanism manufactured by Krupp Grusonwerk, Magdeburg. At Hillersleben, 3 parallel craneways are connected by transverse rails running at right angles. Electric motors drive a screw mechanism which raises the crane off and above the rails, and permits horizontal rotation of the wheel carriage to any desired position. After the carriage has been raised and rotated so that it is directly over and parallel to the transverse rail, the screw mechanism lowers the crane gradually and transfers the load back to the wheel carriage so that it may then be moved along the transverse tracks. Its use in Navy Yards is suggested because of its mobility and accessibility in a small space with minimum trackage. Photographs are included which may not reproduce well.

United States

PB 22685. U. S. ENGINEER BOARD. Construction and test of "V" drags, road, desert: First interim report. (Rept 733, Appendix "A"). Nov 1942. 16 p. Price: Microfilm-50¢ - Photostat-$2.00
Appendix A is a report relative to the construction and test of a V drag, road, desert, brush cutter type, covering all phases of the development of the drag to and including the design and construction of a pilot model by a commercial manufacturer. The purpose of the development and tests was to devise the most effective tool with which to construct a road through desert terrain at a more rapid rate than could be accomplished with conventional road equipment. By the time of this report the development and testing of various road drags had progressed to a point where a definite type had been selected for use in a pioneer road train. A factory built V drag mounted on pneumatic tires had been service tested and was recommended for adoption. Additional development and testing was to be done on a leveler type drag, the results to be the basis of a final report on the subject of drags. This progress report includes photographs of the various drags tested. See PB 22684 (Rept 733) for report on desert pioneer road set.

PB 19127. U. S. WAR DEPARTMENT. Engine, Diesel, Hercules, models DRXB, DRXC, DRXB, and DRXC. (Tech Manual 55-1034) Dec 12, 1944. 114 p. Price: Microfilm-$1.50 - Photostat-$8.00
A discussion of the principles of the Diesel cycle precedes general specifications for two of these 6-cylinder Diesel engines. The four models are not described separately but information given is to be used as it applies. Models DRXB and DRXB have piston displacements of 707 and 474 cu. in., respectively. The DRXB engine has an actual output of 140 HP at its maximum recommended continuous full load speed of 1400 RPM. Instructions for the operation and maintenance of the engines and components include a trouble shooting chart, labled assembly drawings and specific clearance and adjustment data. Photographs, charts, graphs, diagrams and tables are included.

PB 22687. U. S. WAR DEPARTMENT. Truck, fork lift, gasoline, Vaughan-"Taw". (Tech Manual 10-1628) Mar 1946. 156 p. Available from Supt of Docs., Washington 25, D. C., price 45¢
This manual contains comprehensive information on the operation, maintenance, and repair of the vehicle, and descriptions of the major units. The vehicle is powered by a single cylinder, four cycle, air cooled, L-head gasoline engine. It is designed to hoist, handle, transport, tilt and stack materials to desired height and position. The text is fully illustrated with photographs which show parts assembly, maintenance and repair methods, and method of operation of the equipment.

MEDICAL RESEARCH AND PRACTICE, INCLUDING CLINICAL APPLICATION OF DRUGS AND PHARMACEUTICALS

PB 1694. MISCELLANEOUS Medical Reprints. (Microfilm) n.d. 1036 p. Price: Microfilm - $13.50 - Photostat - $70.00
This report consists of a microfilm roll containing articles, mostly reprints, from various German neurologic and psychiatric journals. The material on this roll was found by members of the United States Army Medical Corps in the files of Dr. Hans Spatz and other members of the Anatomic and General Pathologic Section of the Kaiser Wilhelm Institute, Berlin-Buch, Germany. 1. Spatz, H. Gehirnpathologie im kriege. Von den gehirnwunden (Brain pathology in wartime; wounds of brain). Zentralblatt für Neurochirurgie, 6, 162 (1941). 52 p. 2. Peters, G. Die gehirnveränderungen bei stumpfer gewalteinwirkung von vorn (auf die Stirn). (Pathologic changes in the brain resulting from blunt injuries of the forehead). Luftfahrtmedizin, 7, 344 (1942). 38 p. 3. PETERS, G. Über gedeckte gehirnverletzungen (rindenkontusionen) im Tierversuch (Concealed cerebral injuries (cortical contusions); in animal experiments) Zentralblatt für Neurochirurgie, 8, 172 (1943). 38 p. 4. Walte, H. Zur formalen genese der traumatischen mydriasis. Oculomotoriuswurzelschädigung durch einseitiges vorquellen des uncus hippocampi. (Formal genesis of traumatic mydriasis). Injury of the root of the oculomotor nerve resulting from unilateral protrusion of the uncus hippocampi). Ibid., 8. 217 (1943). 18 p. 5. Noetzel, H. Über die pathologische anatomie der traumatischen meningitis bei hirnschussverletzung (Pathologic anatomy of traumatic meningitis following gunshot wounds of the brain). (Title of journal, vol. no. and year unknown; may be Archiv für Psychiatrie, 115) pp. 392-418. (1942). 28 p. 6. Noetzel, H. Die mitbeteiligung des gehirns bei der traumatischen leptomeningitis (Cerebral involvement in traumatic leptomeningitis). Archiv für Psychiatrie, 117, 275 (1944). 34 p. 7. Noetzel, H. Zur kenntnis und abgrenzung des subduralen empyems (General facts about, and definition of subdural empyema). Zentralblatt für allgemeine pathologie und pathologische anatomie, 81, 3 (1943). 12 p. 8. Lepp, H. Über odontogene meningoenzephalitis mit subdural empyem. (Odontogenous meningo-encephalitis with subdural empyema) Deutsche Zahn-, Mund- und Kieferheilkunde, 10, 379 (1943). 22 p. 9. Ilich, K. J. Die entstehung des hirndruckes, insbesondere des prolapses bei der hirnwunde und ihren folgezuständen (Development of intracranial pressure,

particularly of prolapse, following cerebral injuries, and its sequelae). Zentralblatt für Neurochirurgie, 6, 212 (1941). 20 p. 10. Perret, George E. Experimentelle untersuchungen über massenverschiebungen und form veränderungen des gehirns bei volumenzunahme durch ödem oder schwellung (changes in size and shape of the brain as a result of the increase in volume accompanying edema or swelling). Archiv für Psychiatrie, 112, 385 (1940) 29 p. 11. Selbach, H. Physikalisch-chemische untersuchungen zur frage der hirnvolumsvermehrung (hirnschwellung und hirnödem) (Physicochemical examination into the problem of brain volume increase (cerebral swelling and edema)). Ibid., 112, 409 (1940). 36 p. 12. Perret, G. E. and Selbach, H. Chemische untersuchungen bei experimentellen massenverschiebungen und form veränderungen des gehirns. (Chemical studies of experimentally produced changes in size and shape of the brain). Ibid., 112, 441 (1940). 32 p. 13. Spatz, H. Grundriss der pathologischen anatomie der geisteskrankheiten (Outline of pathologic anatomy of mental diseases). Reprint from Lehrbuch der Geisteskrankheiten, 5th ed., 1942. 76 p. a. Pathologisch-anatomische befunde bei der alkoholvergiftung (Pathologic anatomy findings in alcoholic poisoning). 2 p. b. Pathologische anatomie der syphilogenen geisteesstörungen (pathologic anatomy of syphilitic psychoses). 27 p. c. Pathologisch-anatomische befunde bei den psychosen des rückbildungs- und greisenalters. (Pathologic anatomic findings in involutional and senile psychoses). 24 p. d. Pathologisch-anatomische befunde bei der epilepsie (Pathologic anatomic findings in epilepsy). 6 p. e. Pathologisch-anatomische befunde bei schizophrenie. (Pathologic anatomic findings in schizophrenia). 6 p. f. Pathologisch-anatomische befunde beim angeborenen schwachsinn (Pathologic anatomic findings in congenital feeblemindedness) 6 p. 14. Bagh, K. von. Über anatomische befunde bei 30 fällen von systematischer atrophie der grosshirnrinde (Picksoher krankheit) mit besonderer berücksichtigung der stammganglien und der langen absteigenden leitungsbahnen. Eine vorläufige mitteilung. (Anatomic findings in thirty cases of systematic atrophy of the cerebral cortex (Pick's disease) with particular reference to the basal ganglion and the long descending conduction paths; preliminary report). Archiv für Psychiatrie, 114, 68 (1941) 3 p. 15. Spatz, H. Über die 'systematrophien' und die Pickesche krankheit im rahmen dieser gruppe ('Systemic atrophies' and Pick's disease as a member of this group). Reprint from Gegenwartsprobleme der psychiatrisch-neurologischen Forschung (1938), 231. 27 p. 16. Klaue, R. Parkinsonsche krankheit (paralysis agitans) und postencephalitischer parkinsonismus. Versuch einer klinisch-anatomischen differentialdiagnose. (Parkinson's disease (paralysis agitans) and postencephalitic parkinsonism. Attempt at anatomicoclinical diagnosis). Archiv für Psychiatrie 111, 251 (1940). 76 p. 17. Schöpe M. Zur frage "blastom" -"encephalitis". (The problem of "blastoma" -"encephalitis"). Ibid., 109, 755 (1939). 34 p. 18. Hasenjäger, Thea. Über die ependymitis blastomatosa bei ventrikelnahen gliomen. (Ependymitis blastomatosa in the presence of gliomas in the region of the ventricles) Ibid., 110, 605 (1939). 32 p. 19. Hasenjäger, Thea. Über seitenventrikelnahe gliome als eine besondere gruppe unter den grosshirngeschwulsten (Gliomas in the region of the lateral ventricle considered as a special group of cerebral tumors). Ibid., 110, 570 (1939). 39 p. 20. Dei Poli, G., and Sucha, J. Beiträge zur kenntnis der anomalien und der erkrankungen der arteria carotis interna (Abnormalities and diseases of the internal carotid artery). Zentrablatt für neurochirurgie, 5, 209 (1940). 30 p. 21. Krücke, Charlotte. Über das vorkommen von knochengewebe in gehirnarterien. (Occurrence of bony tissue in the cerebral arteries). Archiv für Psychiatrie, 111, 233 (1940) 22p. 22. Läers, Thea. Weitere mitteilungen zur klinik und anatomie der cerebralen form der thromboendangiitis obliterans (v. Winiwarter-Buergersche krankheit). (Further studies on clinical and anatomic aspects of the cerebral form of thromboendangiitis obliterans (von Winiwarter-Buerger's disease). Ibid.,115, 319(1942). 30p. 23. Becker, H. Experimentelle verschlüsse von arterien und venen des gehirns und ihre einwirkung auf das gewebe (Experimental occlusion of cerebral veins and arteries and its effect on the tissue). Zeitschrift für die gesamte Neurologie und Psychiatrie, 167, 546 (1939). 12 p. 24. Lange-Cosack, H. Die hydranencephalie (blasenhirn als sonderform der grosshirnlosigkeit; anatomischer teil (Hydranencephaly as a special form of anencephaly; anatomical study). Archiv für Psychiatrie, 117 (1944). 51 p. 25. Lange-Cosack, H. Die hydranencephalie (blasenhirn) als sonderform der grosshirnlosigkeit; klinischer teil. (Hydranencephaly as a special form of anencephaly; clinical study). Ibid., 117, 595 (1944). 48 p. 26. Weisschedel, E. Die zentrale haubenbahn als ableitende bahn des extrapyramidal-motorischen systems (The central bundle of tegmentum as an efferent conduction path of the extrapyramidalmotor system). Zeitschrift für die gesamte Neurologie und Psychiatrie, 158, 264 (1937). 13 p. 27. Weisschedel, E. Die zentrale haubenbahn und ihre bedeutung für das extrapyramidal-motorische system (The central bundle of tegmentum and its significance for the extrapyramidal-motor system). Archiv für Psychiatrie, 107, 443 (1937). 143 p. 28. Scheibe, Hartmut. Der markgehalt von hirnzentren bei der makroskopischen färbemethode von Mulligan (The medullary content of the brain centers, as seen by Mulligan's microscopic staining method). Ibid., 108, 391 (1938). 20 p. 29. Jung, Richard and Weisschedel, Ewald. Das symptomatologische studium motorischer ausfallserscheinungen nach lokalisierter subcorticaler ausschaltung durch elektrokoagulation (Symptomatologic study of decreased motor function following its localized subcortical exclusion by means of electrocoagulation) Pflüger's Archiv für die gesamte Physiologie des Menschens und der Tiere, 241, 184 (1938). 21 p.

METALS AND METAL PRODUCTS

PB 22329. ANTHONY, H. L. Examination of enemy materiel (OD-113) (AC-77): Metallurgical examination of captured enemy pressure vessels. Progress report 110, Aug 14, 1944. (OSRD Rept 4126; War Metallurgy Committee Rept M-363) Sep 1944. 21 p. Price: Microfilm-50¢ - Photostat-$2.00

The following pressure vessels were examined at the Mellon Institute of Industrial Research: Vessel EMI-487-Japanese oxygen cylinder; vessel EMI-404-German aluminum oxygen cylinder; and vessel EMI-438-German cyna multiple-sphere cylinder. Each type of vessel is described separately in this report because of their dissimilarity in material, construction, and process of manufacture. General conclusions found from the examination of these enemy pressure vessels are listed and data of physical and chemical analysis are given. Tables, photographs and microphotographs are given.

PB 22810. CADY, J. R. and others. Examination of enemy materiel (OD-113) (AC-77): Metallurgical examination of German and Italian 20 mm armor piercing ammunition, 1938-1943. Progress report 51, Mar 24, 1944. (OSRD Rept 3688; War Metallurgy Committee Rept M-381) Apr 1944. 27 p. Price: Microfilm-50¢ - Photostat-$2.00

The sequence developed through a study of projectiles manufactured in six critical years, 1938-1943, reveals a number of changes interesting from an economic standpoint, although there are few changes in design. The projectiles produced were high carbon, chromium steel either of tool steel or ball-bearing steel grade. All were heat treated by quenching and differential tempering to produce hard-nosed projectiles with tough strong bodies. The cartridge cases were made either from brass or steel and each appears to have been manufactured in essentially the same way, with similar or identical machinery and similar heat treatment. Corrosion prevention of the steel cases was attained by the use of a vegetable or mineral drying oil, possibly modified with a resin, and baked at a high temperature to produce a hard coating that would not fuse in a hot breech chamber. Diagrams, photographs, and tables illustrate the report.

PB 22315. GRENELL, L. H. and others. Examination of enemy materiel: Metallurgical examination of hardware from Japanese and German parachute harnesses. Progress report 151, Jan 12, 1945. (OSRD Rept 4897) Feb 1945. 11 p. Price: Microfilm-50¢ - Photostat-$1.00

This report covers the examination of Japanese and German parachute fittings to determine the type of materials, protective coatings, and heat treatment. The parachute harness fittings were formed from plain carbon steels. Some of the Japanese fittings were nickel-chromium steels, and some

of the German fittings were chromium steels with one silicon-manganese steel of the German "Freund" type which approximates our SAE 9000 alloys. One unusual coating was found, consisting of a zinc-nickel plate. A superior corrosion resistance is claimed for this type of coating, compared to nickel or chromium, but the wearing and abrasion resistance would be much lower. Photographs and tables of detailed data are included. This investigation was carried out at Battelle Memorial Institute.

German

PB 22391. BARTHOLOMEW, H. L., JR. and others. Examination of enemy materiel (OD-113): Metallurgical investigation of German 88 mm. guns. Progress report 106, Apr 15, 1945. (OSRD Rept 5110) May 1945. 43 p. Price: Microfilm-50¢ - Photostat-$3.00
An examination of a portion of the tubes and sleeves of 2 German 88 mm. guns, dated 1937 and 1941 respectively, together with the breech ring of the latter, was conducted by the Massachusetts Institute of Technology to determine their metallurgical and mechanical properties, chemical analysis, and method of manufacture. All of the gun components examined are forgings, having good mechanical properties, with the exception of low impact strengths in the tubes and sleeves. A discussion of the procedure of examination is followed by tables giving the markings on the guns, chemical composition of the samples, hardness surveys, tensile properties, V-notch Charpy impact tests at room and low temperatures. Photographs, photomicrographs, drawings, and curves are included.

PB 22539. BARTHOLOMEW, H. L., JR. and others. Examination of enemy materiel (OD-113) (AC-77): Metallurgical investigation of German 105 mm gun tube. Progress report 101, Sep 15, 1944. (OSRD Rept 4261; War Metallurgy Committee Rept M-390) Oct 1944. 17 p. Price: Microfilm-50¢ - Photostat-$2.00
An examination of a 2½ foot section of a 105 mm German gun tube, conducted to determine its method of manufacture, chemical composition, and metallurgical and mechanical properties gave the following result: Visual examination of the ruptures gun barrel indicated the steel to be ductile; chemical analysis showed a steel of low carbon and relatively high nickel and molybdenum content; hardenability is good; hardness values are lower than those found on other German guns; strength properties were low and ductility high; impact properties were good at all temperatures giving fibrous fractures as low as -60°F.; macroscopic examination showed a clean, sound material with some coarse dendrites; microscopic examination revealed an acicular structure with no undissolved carbides or free ferrite; the steel was quenched from a temperature higher than 1550°; condition of the inclusions in the metal indicated that the gun tubing was a forging.

PB 22518. BARTHOLOMEW, H. L., JR. and others. Examination of enemy materiel (OD-113) (AC-77): Metallurgical investigation of a German 170 mm gun tube. Progress report 91, Jul 18, 1944. (OSRD Rept 4000; War Metallurgy Committee Rept M-348) Aug 1944. 18 p. Price: Microfilm-50¢ - Photostat-$2.00
An examination of a section of 170 mm German gun tube taken approximately 14' to 17' from the breach provided the following information relative to the method of manufacture, chemical composition, and metallurgical and mechanical properties: From visual examination of the ruptured gun barrel it was obvious that the steel was brittle; chemical analysis indicated relatively high chromium and nickel contents when compared with other available German gun steel analyses; the hardness survey indicated good uniformity; tensile properties were consistent in line with other gun steels; impact strength values were all low; macro-examination revealed a relatively coarse structure but a reasonably clean and uniform steel; micro examination showed a course acicular structure with some free ferrite but no visible carbides; the steel was quenched from a temperature appreciably above 1550°F. and probably was subjected to only a single quench and draw treatment; the gun tube was manufactured by a forging process. Photographs.

PB 22532. BARTHOLOMEW, H. L., JR., and others. Examination of enemy materiel (OD-113) (AC-77): Metallurgical investigation of two 50 mm German tank gun tubes, breech rings, and breech ring locking collars. Progress report 100, Aug 15, 1944. (OSRD Rept 4135; War Metallurgy Committee Rept M-364) Sep 1944. 42 p. Price: Microfilm-50¢ - Photostat-$3.00
An examination of two 50 mm German tank gun tubes was conducted to determine the method of manufacture, chemical composition, and the metallurgical and mechanical properties. Following are the results of the examination: Very good machining was evidenced on sliding surfaces, and the presence of fillets or rounded undercuts at all changes of section indicates that an attempt was made to reduce the effects of stress concentrations; relatively high chromium content; hardness surveys show good uniformity; tensile properties somewhat lower and ductility somewhat higher than in previously tested guns of this size; impact values for tube R:770 good at all locations, for tube R:6016 comparatively poor at all positions; segregation in tube R:770 but relatively uniform distribution of impurities in gun tube R:6016; neither steel can be considered exceptionally clean; etched structure of tube R:770 exhibits bended conditions whereas very slight bending is noticed in tube R:6016; tube R:770 shows considerable quantities of free ferrite; tube R:6016 has a somewhat more acicular structure with less free ferrite. The steels were quenched from temperatures appreciably above 1550°F. and probably were subjected to only single quench and draw treatments. The appendix contains tables, photographs, diagrams, and curves.

PB 14579. BERTHOLD, R. and SCHILP, W. Magnetische werkstoffprüfung (Reichsluftfahrtministerium, Ringbuch der Luftfahrttechnik II C 12). (Magnetic testing of materials) (ALSOS Mission, Klotter File II B) May 1938. 11 p. Price: Microfilm-50¢ - Photostat-$1.00
This report is one of a series issued by the German Air Ministry. A method by which flaws in ferromagnetic materials can be detected by means of magnetic filings is described. Filings are used to trace out the lines of force surrounding the objects to be tested. Any variation in these lines of forces are seen and the flaws detected. Diagrams explain use of magnetic fields to detect surface or near surface flaws or deep flaws. This paper contains drawings, graphs, photographs and a bibliography.

PB 14581. BRENNER, P. Aluminium-knet-legierungen (Malleable aluminum alloys) Reichsluftfahrtministerium, Ringbuch der Luftfahrtechnik II C 14). (ALSOS Mission Klotter File 11 B) Aug 1939. 14 p. Price: Microfilm-50¢ - Photostat-$1.00
This article is one of a series published by the German Air Ministry. The properties of malleable aluminum alloys as aircraft construction materials are studied. The Al-Mg alloys, Al-Mg-Cu Alloys as wells as those alloys with additional metals are discussed, and their use, strength, and corrosion resistance described. The effects of the hardening of the alloys at room and higher temperature noted. Graphs, tables, photographs and bibliography are included.

PB 14572. BUNGARDT, W. Lagermetalle. (Bearing metals). (Reichsluftfahrtministerium, Ringbuch der Luftfahrttechnik II C 8). (ALSOS Mission, Klotter File 11 B). Sep 30, 1937. 16 p. Price: Microfilm-50¢ - Photostat-$2.00
This report investigates the possibilities of use of various metals and alloys in bearings. Several of the white metals, tin and lead, are considered as well as cadmium, lead, bronze, and alloys with an aluminum and magnesium base. Plastics are also considered. The advantages and disadvantages of the various substances are weighed. Tables, drawings, a bibliography, and photographs are included.

PB 14569. BUNGARDT, W. and OSSWALD, E. Schweissen von leichtmetallen (Welding of the light metals). (Reichsluftfahrtministerium, Ringbuch der Luftfahrttechnik II C 2). (ALSOS Mission, Klotter File 11 B). Aug 21, 1937. 26 p. Price: Microfilm-50¢ - Photostat-$2.00

This report was issued by the German Air Ministry as one of a serie of pamphlets. Welding of the light metals and their alloys, especially aluminum alloys, is covered in this study. Oxy-acetylene and hydrogen torches, molten metal and electric arc methods are discussed. The use of welding wire and welding mixtures is also treated. Spot welding and seam welding are considered as well as the stress and corrosion resistance of the different welds. Comparisons are made of the German, English and American use of the light metals and alloys in aircraft. Tables, diagrams, drawings, and bibliography are included.

PB 22889. CADY, J. R. and others. Examination of enemy material (OD-113): A chemical and metallurgical examination of a German caltrop or tire puncture. Progress report, May 28, 1943. (OSRD Rept 1564) Jul 1943. 8 p. Price: Microfilm-50¢ - Photostat-$1.00
Examination of a German caltrop of modern design used to puncture pneumatic tires reveals the adaptation of an ancient implement of warfare to modern manufacturing processes and materials. A metallurgical examination indicated that basic, open-hearth, killed steel of higher than average carbon content had been used and that scrap mill ends may have been the source of the material. The welding practice, while not good, is considered adequate for the service conditions encountered. The design takes advantage of the strength of triangular bracing, the economy of using sheet steel, and a saving in material resulting from symmetrical construction. Chemical composition of caltrop steel is shown in table 1. Photographs and drawings are included.

PB 22890. CADY, J. R. and others. Examination of enemy material (OD-113): A chemical and metallurgical examination of a German needle bearing. Progress report 10, Jun 3, 1943. (OSRD Rept 1635) Jul 1943. 13 p. Price: Microfilm-50¢ - Photostat-$1.00
This bearing removed from German equipment is composed of an inner and outer race separted by rollers of small diameter that give the assembly its name of needle bearing. A lock or clutch engages two lugs on the inner race and prevents it from turning. The steel used in the bearing, except for the needle rollers which contain 0.6 percent chromium, would not be classed as alloy steel. The inner and outer races have been case hardened, probably in a liquid carburizer or cyanide pot, and heat treated to yield a hard thin case which shows signs of failure. The needle rollers were also hardened by heat treatment. The clutch appears to be in the as-forged condition. Wear marks indicate that the bearing was used in a shackle and rotated through only a few degrees. Wear marks also indicate either a poor alignment of the various parts or eccentric loading. Fatigue cracks advancing from the lugs on the inner race would soon cause failure of the entire bearing. Although numerous recessed fillets on both the roller races indicate that some attention has been given to fatigue, the design of the holding lugs does not appear satisfactory. Grinding cracks were found on the collar of the inner race. Spectrographic analysis of bearing steel is shown in table 1, and results of hardness tests in table 2. Photographs are included.

PB 14568. CORNELIUS, H. Schweissen von stahl (Welding of steel). (Reichsluftfahrtministerium, Ringbuch der Luftfahrttechnik II C 1). (ALSOS Mission, Kletter File 11 B). May 13, 1937. 13 p. Price: Microfilm-50¢ - Photostat-$1.00
This study was issued by the German Air Ministry. The report discusses the importance of the welding of steel and alloys in aircraft construction. Acetylene and oxyhydrogen torches are treated and the various types of welding such as spot, seam and arc weldings are gone into. The welding of carbon steel, stainless steel and special alloys are studied. There are comparisons of the various methods and some properties of the welds. Tables of German and American metals are given and their applications tabulated. Other tables, graphs, and a bibliography are included.

PB 14571. CORNELIUS, H. Ventilfederdrähte, spanndrähte (Valve spring wire, spun wire and cable). (Reichsluftfahrtministerium, Ringbuch der Luftfahrttechnik II C 4). (ALSOS Mission, Kletter File 11 B). Aug 1, 1937. 10 p. Price: Microfilm-50¢ - Photostat-$1.00
This is one of a series of pamphlets issued by the German Air Ministry. The report covers the uses of wire for various purposes and discusses the manufacture, tensile strength, corrosion proofing, and testing of the different types. There is a comparison of the properties of tempered and cold-drawn wire. Tables, bibliography, and graphs are included.

PB 14570. CORNELIUS, H. Warmfeste und runderbeständige werkstoffe (Heat and fire resistant materials). (Reichsluftfahrtministerium, Ringbuch der Luftfahrttechnik, II C 3). (ALSOS Mission, Kletter File 11 B). Mar 30, 1937. 13 p. Price: Microfilm-50¢ - Photostat-$1.00
This is one of a series of pamphlets issued by the German Air Ministry. The need of the aircraft industry for especially heat resistant materials is discussed. Alloys are studied for properties which would be useful for special parts of engines, such as valve parts, exhaust tubes, pistons, Diesel turbine blades. Analyses of different alloys such as monel metal, stellite, bronze, etc., are given as are results of heat and performance tests. Bibliography and tables are included.

PB 18259. DEUTSCHE EDELSTAHLWERKE A. G., KREFELD. Thermax stähle. (MIS VII 70 a 7003443) Sep - Oct, 1937. 8 p. Price: Microfilm-50¢ - Photostat-$1.00
The heat and ignition-resistant Thermax steels are divided into Cr and Cr-Ni steels. The pamphlet contains 7 pictures and detailed tables which show how the various types of steel resist heat and chemical attack. They list the ignition loss under various temperature ranges for the types of steel and the conditions for treatment (forming, bending, welding, etc.) They can be used for hardening, for annealing, for construction of furnaces and their components, and for the glass, porcelain, cement, and nitrogen industries. Correspondence and other sheets are included giving properties of the steels. In German.

PB 14963. EICHINGER, ANTON. Zur ausbreitung elastischer wellen in festen körpern (Propagation of elastic waves in solids) (Kaiser Wilhelm Institut für Eisenforschung). (ALSOS Mission, Kept File 301) May 15, 1945. 10 p. Price: Microfilm - 50¢ - Photostat - $1.00
Mathematical analysis of the propagation of elastic waves in solids based on Hooke's law.

PB 22505. EVANS, R. M. and others. Examination of enemy material (OD-113)(AC-77): Metallurgical examination of a German 75 mm H. E. Hollow charge shell. Progress report 46, Mar 10, 1944. (OSRD Rept 3538; War Metallurgy Committee Rept M-246) Apr 1944. 13 p. Price: Microfilm-50¢ - Photostat-$1.00
The projectile was disassembled, and all but two of its parts were examined chemically and metallographically. The part known as the booster or gaine, the paper washers, and the shell case were not examined. No radical differences in type of material or method of manufacture from shells of this type previously examined were noted. The body of the shell was SAE 1075 steel, the nose adapter was a zinc base die casting of the Zamak type (4.0% aluminum), and the rotating band was sintered iron powder impregnated with wax. The appendix contains photographs and data in tabular form.

PB 14578. FISCHER, H. Oxydische überzüge; chemische und elektrochemische oberflächenbehandlung (Oxide coatings; treatment of surfaces by chemical and electrochemical means). (Reichsluftfahrtministerium, Ringbuch der Luftfahrttechnik II C 11). (ALSOS Mission, Kletter File 11 B). Jan 31, 1938. 10 p. Price: Microfilm-50¢ - Photostat-$1.00
This is one of a series of papers published in German by the German Air Ministry. Methods of adding oxide layers to light metals for strengthening the thin natural oxide layer are here considered. Chemical and electrochemical methods for use on aluminum and magnesium are described. The study examines the properties of the oxide layers and discusses their value. Methods of testing oxide coatings are also given. Graphs and bibliography are contained in this report.

PB 20458. GERMANY. KAISER WILHELM GESELLSCHAFT ZUR FORDERUNG DER WISSENSCHAFTEN. Jahresberichte an die gesellschaft (Annual reports to the Kaiser Wilhelm Gesellschaft) (ALSOS Mission, RFR 462) 1922-1944. 205 p. Price: Microfilm - $2.50 - Photostat - $14.00
This file contains the financial and annual activity records of the Kaiser Wilhelm Institute für Eisenforschung in Düsseldorf including report on the mechanical physical, chemical and metallurgical experiments on iron and ore and list of scientific publications. The reports were made to the central administration of Kaiser Wilhelm Gesellschaft in Berlin during the years 1922-1944 and contain also the changes in the personnel staff.

PB 20455. GERMANY. REICHSFORSCHUNGSRAT. Fachsparte eisen und stahl. Forschungsauftrage - allgemeines. (General correspondence on the research work of the iron and steel section) (ALSOS Mission, RFR 434) May 1943 - Nov 1944. 163 p. Price: Microfilm - $2.00 - Photostat - $11.00
This file contains all secret orders given to the iron and steel section by OKH (Army High Command) Heereswaffenamt, Berlin, Tirpitzufer 72-76, the Airforce (Forschungsführung der Luftwaffe) Berlin, and the Navy (Section FEP-Forschung (research) Erfindung (inventions) P (patents). The reports of the metallurgical institutes of Aachen, Berlin, Bonn, Clausthal, Darmstadt, Göttingen, Hanover, Münster Leipzig, Leoben, Frieberg and Strassburg (Alsace) are given in full details. The reports are dated from July to December 1944.

PB 20456. GERMANY. REICHSFORSCHUNGSRAT. Reichsforschungsrat akte III. Verkehr mit dem Institut (Correspondence with the Kaiser Wilhelm Institut für Eisenforschung) (ALSOS Mission, RFR 457) 282 p. Price: Microfilm - $3.00 - Photostat - $19.00
This correspondence covers the research assignments given to the Institute for Iron and Steel Research in Clausthal-Zellerfeld by Reichsforschungsrat up to March 1945 including the metallurgical development of the Thomas procedure and the extraction of vanadium from Thomas slag and many other tasks mainly in the interest of Army, Navy and Airforce. Detailed lists of the research workers in the iron and steel section are added.

PB 18760. GERMANY. REICHSFORSCHUNGSRAT. Reports of the research group on "non-ferrous metals". (ALSOS Mission, RFR 484) Aug 1944 - Sep 1944. 144 p. Price: Microfilm - $1.50 - Photostat - $10.00
This file contains a complete list of all German institutes for metallurgical research and the reports of these institutes on their preeminent tasks for the war effort. The names of the research workers are given and their special tasks are described in full detail. The reports were made to enable the Reichsforschungsrat to coordinate and concentrate this branch of scientific German research work for the totalitarian war effort. Among the great number of tasks the milling of cast iron is noted.

PB 20460. GERMANY. REICHSFORSCHUNGSRAT. Sachbeihilfe A-F (Correspondence concerning governmental subsidies for individuals entrusted with research projects) (ALSOS Mission, RFR 441) Jul 1938 - Oct 1942. 264 p. Price: Microfilm - $3.00 - Photostat - $18.00
The governmental subsidies were granted for the following research projects: Research on atmospheric corrosion of aluminum and zinc etc. to the Material-Prüfungsamt, Berlin-Dahlem (Prof. Arndt); on sulfides and phosphides of metals to the Institute for Inorganic Chemistry, Hanover, (Prof. Biltz); on recrystallisation of pure aluminum to the School of Technology at Munich (Prof H. Borchers), on piezoelectric cylinder pressure (Walsdruck) to the Mining Academy at Freiberg, Saxonia, (Prof. Reicke) and others.

PB 20451. GERMANY. REICHSFORSCHUNGSRAT. Sachbeihilfe G-L (Correspondence concerning governmental subsidies for individuals entrusted with research projects, filed by surnames G-L). (ALSOS Mission, RFR 442) n. d. 691 p. Price: Microfilm-$7.00 - Photostat-$47.00
The governmental subsidies are granted on recommendation of Deutsche Forschungsgemeinschaft (Notgemeinschaft der Deutschen Wissenschaft) to the Institutes (of the Kaiser Wilhelm gesellschaft) for metallurgy in Stuttgart (Prof. Koester), Dresden (Prof. Guertler), Vienna (Prof. Halla), Berlin (Prof. Hanemann and Prof. Kohlmeyer), Göttingen (Prof. Fritz Laves). Subsidies are given mostly for research work on cobalt-manganese, nickel-wolfram, barium-bismuth, aluminum-manganese, manganese-lead alloys and their German substitute alloys, especially their resistance against chemical reaction, and on the use of iron for the manufacturing of cartridge cases, etc.

PB 20454. GERMANY. REICHSFORSCHUNGSRAT. Vierteljahres-sitzungen und vierteljahresberichte der abteilungen (Quarterly meetings and reports of the departments) (ALSOS Mission, RFR 481) 118 p. Price: Microfilm-$1.50 - Photostat-$8.00
In these quarterly reports, dated from January 1943 to July 1944, the metallurgical research institutes of Düsseldorf and Clausthal are rendering account of their scientific work, experiments as well as publications, on current and special tasks for the German High Command and for German private industry. Included are the chemical, the physical, and the mechanical divisions and those reporting on ore. Full details are given.

PB 20459. GERMANY. REICHSMINISTER FÜR RÜSTUNG UND KRIEGSPRODUKTION. Sonderringe werkstoffe in den hauptringen eisenerzeugung, guss und schmiedestücks (Special branch: "material" in the main branch: iron production, cast and wrought iron): Reports and correspondence. (ALSOS Mission, RFR 482) 1944. 87 p. Price: Microfilm - $1.00 - Photostat - $6.00
This file contains regulations given by the German minister for armament and war production to metal foundries and research institutes concerning the shortage of raw materials especially on how to save manganese. It also includes a list of standardized American steels, translated into German from a compilation by the U. S. General Technical Committee on National Emergency steels, issued in 1943 in cooperation with the War Production Board and the American Iron and Steel Institute. A confidential article, dated by Prof. Adolf Fry on titanium as an alloy for steel is included.

PB 22582. GILLETT, H. W. Examination of enemy materiel: Fabrication methods used on a bimetal driving band on an 88 mm German projectile, and copper conservation through use of bimetal bands. Progress report, Jan 14, 1943. (OSRD Rept 1216) Feb 1943. 13 p. Price: Microfilm-50¢ - Photostat-$1.00
The driving band was probably constructed by roll welding a copper plate onto an ingot iron plate. After being rolled approximately to size, the bimetal strip was annealed at a temperature sufficient to re-crystallize the iron base metal and further rolled to produce the proper physical properties for the remaining forming operations. After temper rolling, the sheet was slit, sheared to length and given a preliminary forming operation. The performed strip was then cold pressed into an undercut keyway on the projectiles. Obviously, no new problem of wear in the gun barrel is present as the bimetal, copper or gilding metal, forming the working part will act just as does an all-copper or all-gilding metal band. The iron part of the band merely serves as an anchor. Therefore, the problem is to produce a tight bond between the iron and the copper such as was obtained on this sample. Fabrication of the driving band in the manner used on the projectile examined would result in a considerable saving of labor because of the simpler mechanical operations involved. Roughly, half of the copper or gilding metal now used on driving bands could be replaced by iron or soft steel, if the bimetal band was adapted. Several American manufacturers of bimetal could readily produce the bands. Photomicrographs are included.

PB 22583. GILLETT, H. W. Examination of enemy materiel: A metallurgical study of a sample of German surface hardened armor plate. Progress report, Feb 27, 1943. (OSRD Rept 1299) Mar 1943. 21 p. Price: Microfilm-50¢ - Photostat-$2.00

the Charpy and Izod impact values of this plate were approximately 10 foot-pounds, and would indicate that the chemistry and heat treatment of the steel were not selected to produce high impact values. The steel, silicon killed with some aluminum addition for grain size control, was probably melted in an electric furnace and the plate fabricated by rolling predominately in one direction with a slight amount of cross rolling. Essentially the steel is of the W.D. 4150 type with the addition of vanadium. Examination of the surface hardened layer indicated that because of the uniformity of the hardened layer, induction hardening may have been used. The spectroscopic and chemical analyses of the armor plate and welded-on lug are given in table 1, and the Charpy and Izod impact values shown in tables 2 and 3. Graphs, photographs, and section of armor plate showing arrangement for the welded lug, are included.

PB 22332. GRENELL, L. H. and others. Examination of enemy materiel: Metallurgical examination of a German 88 mm. A. P. H. E. C. E. C. Pak 43 shell. Progress report 168, Mar 31, 1945. (OSRD Rept 5049) May 1945. 18 p. Price: Microfilm-50¢ - Photostat-$2.00
Examination showed that the steels used in the German Pak 43 88 mm. round were melted in basic open hearth basic electric furnaces. Aluminum and/or silicon were used for deoxidation. Meticulous care was taken to adjust the composition to the hardenability requirements of the different sections (body and cap) so as to make economical use of alloying metals. Silicon and manganese seem to have been used to replace some of the more scarce alloy metals. The windshield and cartridge case were drawn from fully annealed low-carbon steel (W. D. 1010). The two driving bands were made from powdered compacts of very low-carbon steel; voids between particles were filled with wax. Discussion of economic considerations and detailed descriptions of the various parts, photographs, microphotographs, charts of Vickers hardness survey, and tabulated data are included in this report prepared at the Battelle Memorial Institute.

PB 22334. GRENELL, L. H. and others. Examination of enemy materiel: Metallurgical examination of German MP-43/1 7.92 mm. machine pistol. Progress report 162, Mar 3, 1945. (OSRD Rept 4915) Apr 1945. 9 p. Price: Microfilm-50¢ - Photostat-$1.00
The gas operated MP-43/1 machine pistol examined was manufactured entirely from plain carbon steels. Sheet stampings were extensively used, with the assemblies being formed and held by riveting, spot welding and crimping. Of the 27 parts examined, 13 were heat treated with 8 of the 13 parts carburized. A black-oxide coat for corrosion protection was found on most of the metal parts. The barrel, which showed some wear, was forged from SAE 1060 steel, and rifled by a broaching process. An unusual design feature was used, the gas chamber and piston being on top of the barrel in place of the usual positions underneath or on the side of the barrel. Included in this report prepared at Battelle Memorial Institute are discussion of findings, photographs and tabulated data.

PB 22601. GRENELL, L. H. and others. Examination of enemy materiel (OD-113): Metallurgical examination of German MG-151 gun parts. Progress report 44, Feb 1, 1944. (OSRD Rept 3407; War Metallurgy Committee Rept M-238) Mar 1944. 11 p. Price: Microfilm-50¢ - Photostat-$1.00
Five parts of the breech and bolt mechanism of the German 15 mm machine gun were examined. The method of manufacture, heat treatment, and analyses were determined. The material used was the best available and showed no evidence of a desire to conserve alloying metals. The workmanship and treatment were superb and the parts were of the highest quality throughout. Photographs and charts illustrate the report.

PB 22604. GRENELL, L. H. and others. Examination of enemy materiel (OD-113) (AC-77): Metallurgical examination of German armor piercing tungsten carbide rounds of 28/20, 37, and 50 mm calibers. Progress report 41, Jan 24, 1944. (OSRD Rept 3538; War Metallurgy Committee Rept M-248) Apr 1944. 18 p. Price: Microfilm-50¢ - Photostat-$2.00
A series of German armor piercing carbide rounds bearing the dates from 1940 to 1942 were examined. The changes in the rounds examined are presented in tabular form. Of interest was the change in the projectile bodies of the 28/20 rounds of 1940, 1941, and 1942. The projectile bodies were machined from W. D. 1010 bar stock in 1940, but in 1941 and 1942, the body was divided into the nose and flange section which were forged and press fitted in place. In addition, the bodies were lacquered in 1941 and 1942, and the aluminum nose caps were anodized. The tungsten carbide cores were of two types, showing case and sintered structures. The cast structure was found in the later years, 1941 and 1942, and only in the 28/20 and 37 mm calibers. Examination results are presented in tables in the appendix. There are photographs and drawings of the shells.

PB 22608. GRENELL, L. H. and others. Examination of enemy materiel (OD-113) (AC-77): Metallurgical examination of German 50 mm A.P. - H.E. (monobloc) shells with long and short cartridge cases. Progress report 47, Mar 16, 1944. (OSRD Rept 3586; War Metallurgy Committee Rept M-253) Apr 1944. 25 p. Price: Microfilm-50¢ - Photostat-$2.00
Four inert German 50 mm armor piercing, high explosive rounds were examined. In general, the rounds were similar from the standpoint of method of manufacture, chemical analysis, and heat treatment. Most of the steels used were produced in basic open-hearth furnaces or basic electric furnaces. The projectiles were manufactured by butt welding high carbon-chromium steel noses to medium carbon-chromium molybdenum steel bodies. The noses and bodies were machined from bar stock. The projectiles were heat treated after welding, the heat treatment consisting of differential heating and uniform quenching, probably in oil. The hardness in each projectile decreased gradually toward the weld from a high value at the nose tip; across the weld the hardness dropped rapidly, and then more slowly toward the rear end of the projectile. The microstructure in the nose of each projectile consisted of martensite with excess carbides; at the welds, of martensite; in the base, of ferrite and martensite, the amount of ferrite increasing toward the rear of each projectile. In the area extending approximately 1½" from the rear of No. 188, the microstructure showed ferrite, martensite, and partially spheroidized carbides. The welds were of fair quality. The cartridge cases were cold drawn from WD1015 type steel and exhibited the usual hardness and microstructural characteristics for this steel in this application. The exterior and interior of the cases were covered with thin plated coatings of brass on top, and copper adjacent to the steel. The primer bodies of Nos. 180 and 188 were forged from 60-40 and 70-30 Cu - Zn alloys, respectively. The fuse bodies and tracer bodies were machined from bar stock. The tracer liners were deep drawn from sheet steel and had plated copper coatings of uniform .001" thickness on the inner and outer surfaces. Numerous fuse, primer, and tracer assembly parts were fabricated from steel, brasses, and duralumin. Photographs, diagrams, and data in tabular form are found in the appendix.

PB 22607. GRENELL, L. H. and others. Examination of enemy materiel (OD-113) (AC-77): Metallurgical examination of German 50 mm H.E. shells with long and short cartridge cases. Progress report 50, Mar 23, 1944. (OSRD Rept 3585; War Metallurgy Committee Rept M-262) Apr 1944. 24 p. Price: Microfilm-50¢ - Photostat-$2.00
Examination of six inert German 50 mm high explosive rounds with percussion detonating fuses showed that most of the ferrous parts of these rounds were fabricated from steels produced in basic open-hearth furnaces. The steels used in all the cartridge cases and in the primer body of the 1940 long cartridge case were deoxidized with aluminum; the other steels with silicon. The materials and the fabrication methods used in the production of the major parts of these rounds are listed in tabular form. Numerous parts of the primer and fuse assemblies were manufactured from steel, brasses, aluminum, and duralumin. Protective coatings varied considerably. Photographs, diagrams and tables illustrate this report.

PB 22806. GRENELL, L. H. and others. Examination of enemy materiel (OD-113) (AC-77): Metallurgical examination of a series of six 7.9 mm MG-17 German aircraft gun barrels, 1937-1942, and four 13 to 20 mm. Progress report 45, Mar 1, 1944. (OSRD Rept 3548; War Metallurgy Committee Rept M-250) Apr 1944. 18 p. Price: Microfilm-50¢ Photostat-$2.00
Examination showed that MG-17 gun barrels were made of medium carbon steel by the open hearth and electric furnace process. The remaining barrels were of chromium-molybdenum and nickel-chromium-molybdenum steels of electric furnace manufacture. None of the barrel steels were free from machining, and none had enough aluminum added to control the grain size during heat treating. Scrap appeared to be used as a large part of the charge, especially in the alloy steels. Barrels manufactured in 1937 and 1938 were machined from bar stock. Those manufactured after 1938 were hammer forged. All the barrels had a black oxide gun metal finish with one having a phosphorized coating. The rifling was well machined with even land contours. The hardness and microstructure of any one barrel were quite uniform. Tables and photographs are included.

PB 22392. GRENELL, L. H. and others. Examination of enemy materiel (OD-113;AC-77;M-119): Metallurgical examination of German tank armor plate. Progress report 180, Apr 26, 1945. (OSRD Rept 5133) May 1945. 11 p. Price: Microfilm-50¢ - Photostat-$1.00
This report from the Battelle Memorial Institute, presents the results of a metallurgical examination of armor plate from several German tanks, for chemical composition, heat treatment, and physical properties. The armor plate was produced in basic electric and open hearth furnaces with Si, Al, V, and Ti used for deoxidation and grain size control. The German armor plate was higher in C and alloying elements, and harder than comparable armor plate produced in the United States. Tensile properties were normal for these steels at the respective hardness levels. Some of these plates showed unusually high V-notch Charpy impact resistance at room temperatures. A discussion of the procedure of examination is followed by tables on the chemical analysis of German tank armor, general data on the type of material giving the composition and treatment of each, and on the physical properties of each.

PB 18262. GUTEHOFFNUNGSHÜTTE. STEINKRADE. Charts illustrating the qualities of some special steels. (MIS VII 70 a 7002442) Nov - Dec 1937. 23 p. Price: Microfilm-50¢ - Photostat-$2.00
This material consists of charts showing creep strength for steel and iron pipes from various German sources. Among these are two showing creep strength for austenitic steel pipes, several charts for Krupp specification, one for Deutsche Edelstahlwerk specifications, and several for steel having American specification.

PB 23395. HANNOVERSCHE MASCHINENBAU A. G., HANNOVER-LINDEN. Guide rings for shells made from iron sulfide by powder metallurgy. 1940-1944. 1690 p. Price: Microfilm - $17.00 - Photostat - $113
This report as received consisted of three microfils reels of copies of files on this subject.
A.-G. der Emaillierwerke u. Metallwarenfabriken Austria, Vienna; Bergbau A.G. Salzgitter, Salzgitter; Theodor Bergmann & Co., Berlin; Deutsche Edelstahlwerke Metallwerk Plansee G.m.b.H., Reutte, Tyrol; Düsseldorfer Eisenhüttengesellschaft, Ratingen; Deutsche Waffen-u. Munitionsfabriken A.-G., Berlin-Borsigwalde; Eisen-u. Hüttenwerke A.G., Werk Thale, Thale am Harz; Hartstoff-Metall-A.G. (Hametag), Berlin-Köpenick; Hannoversche Maschinenbau. A.-G. (Hanomag), Hannover-Linden; Oswald Kunsch, Maschinen-Fabrik, Elektro-u. Si-Stahlwerk, Rasberg, Zeitz; F. A. Lange A.G. Olbernhau-Grünthal; Ringsdorff-Werke K.-G. Werk Sobrten, Sobrten bei Teplitz-Schönau; Mansfeld A.G. für Bergbau-u. Hüttenbetrieb, Hettstedt; Schweimer Eisenwerk Müller & Co. Schwelm/Westf; Metallwerke Ringsfeld-Niederdonau; Otto-Albright-Fahrradwerke, Cologne-Lindenthal; Vereinigte Deutsche Metallwerke A.G., Zweigniederlassung Basse & Selve, Altena/Westf; Vereinigte Deutsche Metallwerke A.G. Werk Hedernheim, Frankfurt/Main-Hedernheim; Vogel & Noot A.G. Wartberg-Mürztal/Steiermark; Reel I contains mainly the results of tests of physical properties of the rings as performed by the Hannoversche Maschinenbau A.G. on request of other firms in behalf of the German army. Pp. 275-281 give preliminary directions for use of a rust protecting and cold bonderising procedure. Reels II and III contain numerous reports on meetings in which representatives of the various firms discuss their experiences, describe improvement of the powders, ratios of powder mixtures, procedures in the several phases of production, etc. On p. 1026 (reel II) Thomas powder is analysed as follows: C 0.05%, Mn 0.32%, P 0.101%, S 0.04%, H_2O 0.017% Pp. 1171-1174 contain the reply to a request for information on power consumption for all phases of production of FeS-rings in KWh/Kg in 1943. Average was 2.98 KWh/Kg. The text of a lecture entitled "Sinter materials in nature and sintered industrial materials of technology" is given on pp. 1189-1203. It summarizes the historical development of procedures and application for various industries. On p. 1226 standards are given for FeS-rings as of March 1, 1943.

PB 14586. HERMANN, L. Aluminiumgusslegierungen. (Aluminum alloy castings). (Reichsluftfahrtministerium, Ringbuch der Luftfahrttechnik II C 20) (Alsos Mission, Klotter File 11B) Feb 1940. 20 p. Price: Microfilm-50¢ - Photostat-$2.00
This report is one of a series put out by the German air ministry. The casting of aluminum alloys is described starting with the preparation of the mold and the heating and pouring of the melt. The subsequent treatment of the casting, annealing, stress relieving, inspection and testing is also described. The specific properties of various alloys of aluminum are tabulated. The report contains drawings, graphs, tables and a bibliography of 133 items.

PB 20086. MCKENNING, F. and others. German light alloy foundry industry. (BIOS Final Rept 316, Item 31) Mar 1946. 22 p. Price: Microfilm-50¢ - Photostat-$2.00
The following foundries were visited in order to advise evaluation of laboratory and foundry plant equipment considered useful for technical development: Vereinigte Deutsche Metallwerke A. G., Hildesheim; Otto Fuchs, Meinershagen; Metallwerke Gustav Inhäuser, Olpe; Rudolph Rautenbach, Solingen. Equipment found is described. Generally there was no evidence to prove that the design or efficiency of foundry plant and equipment had any outstanding advantage over that installed in modern English factories but laboratory equipment installed for metallurgical control and X-ray examination was of a high order and of a variety not normally possessed by foundries in the United Kingdom. It was evident that production during the war had been highly organised and restricted to certain types of castings in individual foundries, which to a large extent accounted for the high production rate attained. The Vereinigte Deutsche Metallwerke A. G. had manufactured both cast iron and aluminum castings. This was the one modern factory visited which was in a fit condition to obtain accurate knowledge of foundry techniques. The main products of Otto Fuchs were aluminum forgings and pressing, extrusions, and wire. The Metallwerke Gustav Inhäuser had manufactured aluminum and brass castings for mining, cement, railway and electrical industries. Rudolph Rautenbach had manufactured aluminum castings. The following discussions appear in appendices: "Development of a ternary modifying salt for silicious aluminum alloys", and "Development of moulding and core binders". Both of these developments were invented by Klaus Grossman and German patents or patent applications involved are listed.

PB 22938. MAYO, W. H. Quenching billets and bars directly from rolling at Ruhrstahl, Witten. (Naval Tech Mission in Europe Tech Rept 413-45) Sep 1945. 16 p. Price: Microfilm-50¢ - Photostat-$2.00
This report covers experimental production equipment used at the Witten Plant of Ruhrstahl A.G. in quenching billets and bars directly from the rolling mill without reheating. Satisfactory metallurgical results were obtained on a number of

carbon and alloy constructional steels. Ruhrstahl notes that bar steel hardened in this way (from rolling mill temperatures) has produced the same physical properties as those given by normal tempering. Moreover, hardening at the rolling mill gives the additional advantage that all the carbides are in solution at the time of quenching, thus contributing to greater hardenability. At the same time the grain size is as small or smaller than that which would be achieved on reheating to quench. Drawings are given of the experimental installation for hardening at the 320 barmill, experimental layout for the billet mill, and production outlay planned after completion of experiments.

PB 22826. PRENTICE, T. M. A weather resistant temporary coating for metal. (Naval Tech Mission in Europe Tech Rept 391-45) Sep 1945. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
This report presents a discussion and method of preparation of a compound manufactured by Vereingte Lackfabriken of Hamburg, Germany, which was formulated to protect metallic surfaces from rust and corrosion during shipment.

PB 14577. SIEBEL, G. and GRÜBER, H. Korrosionspruefverfahren (Methods of corrosion-testing). (Reichsluftfahrtministerium, Ringbuch der Luftfahrttechnik II C 10). (ALSOS Mission, Klotter File 11 B). Jan 31, 1938. 18 p. Price: Microfilm-50¢ - Photostat-$2.00
This study is one of a series issued by the German Air Ministry. A discussion of the theory of corrosion due to chemical or electrochemical action and a review of non-corrosive alloys is first presented. General rules for testing corrosion of airplane construction metals are given, followed by a description of various laboratory and field methods. A special section on study of corrosion in airplane engines is included. Tables, diagrams, photographs, and bibliography are contained in the text.

PB 14573. SPITALER, P. Guss-und knetlegierungen auf magnésiumgrundlage (Magnesium-base cast and forged alloys). (Reichsluftfahrtministerium, Ringbuch der Luftfahrttechnik II C 6). (ALSOS Mission, Klotter File 11 B). Jan 15, 1938. 14 p. Price: Microfilm-50¢ - Photostat-$1.00
This is one of a series of pamphlets issued by the German Air Ministry. The possibilities of magnesium for use in aircraft are investigated. The casting (sand, ingot, and die) and the forging of the alloy is described. The chemical and physical properties of the forgings is discussed and the use of the different casts or forgings considered. Tables, diagrams, photographs, and bibliography are included.

PB 21828. TOUR, SAM. Powder metallurgy. (FIAT Final Rept 69) Sep 1945. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
This report describes the work that has been carried on at the Metallwerke Reutte Planasee in the Austrian Tyrol. During the war Dr. Kieffer and Dr. Hotop were engaged in research and development work in powder metallurgy at this plant. They were engaged in preparing a new volume on iron and steel powders and were planning a revision of their 1943 book on powder metallurgy in general. The author states that these two volumes will be of great interest to producers and users of powdered metal products and recommends that their completion be permitted. This document will not reproduce well.

PB 18285. WASSERROHRKESSEL "system Walther" (Tubular water boilers "Walther system") (MIS VII 67g 7001765) n. d. 4 p. Price: Microfilm - 50¢ - Photostat - $1.00
This material consists of two German drawings showing front and side elevation of a tubular boiler "System Walther"

Japanese

PB 22319. ANTHONY, H. L. Examination of enemy material: Metallurgical examination of captured Japanese aluminum pressure vessels used for the storage of oxygen. Progress report 155, Jan 18, 1945. (OSRD Rept 4812) Mar 1945. 21 p. Price: Microfilm-50¢ - Photostat-$2.00
Two Japanese oxygen cylinders were examined: EMI-621, 7020 c.c. capacity, and EMI-62, 3316 c.c. capacity. Each consisted of a deep drawn cylinder with a pressed and spun neck. The body of the cylinder was made from an alloy similar to that of 17S-T but with a slightly lower magnesium content. Solution potential measurements indicated that the alloy had been given a solution heat treatment and had not been artificially aged. The tensile properties of the cylinders were below the minimum values given in the U. S. Government specifications for 17 S-T alloy. Microstructure of the EMI-621 cylinder indicated rapid quenching; cylinder coating including neck rings appeared to be similar to a chromic acid anodic type; neck ring was made from a forging similar in composition to the 17S alloy; and the threaded collar for the protection cap was found to be a brass similar in composition to the 70:30 type. Microstructure of EMI-622 indicated more undissolved constituent was present than that normally encountered with 17S-T alloy which would appear to suggest slow cooling; cylinder coating appeared to be similar to a chromic acid anodic type; neck ring was not anodically treated; and neck ring was machined from a forging similar in composition to the 17S alloy. Photographs and tables are included. This report was prepared at the Mellon Institute for Industrial Research.

PB 22541. ANTHONY, H. L. Examination of enemy material (OD-113) (AC-77): Metallurgical examination of Japanese oxygen and carbon dioxide cylinders. Progress report 117, Sep 9, 1944. (OSRD Rept 4267; War Metallurgy Committee Rept M-394) Oct 1944. 25 p. Price: Microfilm-50¢ - Photostat-$2.00
The findings in an examination of one oxygen and two carbon dioxide cylinders of Japanese origin are presented in this report prepared at the Mellon Institute. Two were spun cylinders made from SAE 1050 seamless tubing, manufactured by hot spinning the bottom and top of the cylinder. Due to poor bottom closures, the unsound metal was removed and plug welded. After plug welding, no subsequent heat treatment was given the cylinders. Cracks of a considerable number and size were found in the plug weld and the heat-affected zone. The third cylinder was drawn and made from an alloy similar to 17S but with magnesium content lower than the 17S American alloy. It was manufactured by pressing, annealing, and spinning of the valve neck. The neck reinforcing ring was made of an alloy having a composition similar to that of the American 25S alloy. Further descriptions are given, together with discussion of findings, tabulated data, photographs, and photomicrographs showing microstructure of the cylinders.

PB 22336. GRENELL, L. H. and others. Examination of enemy material: Metallurgical examination of armor plate from Japanese aircraft "Frank". Progress report 174, Apr 24, 1945. (OSRD Rept 5108) May 1945. 6 p. Price: Microfilm-50¢ - Photostat-$1.00
The armor plate examined averaged 0.489 inch in thickness and was sawed from a large piece of cross-rolled Ni-Cr-Mo steel which was produced in a basic electric or open-hearth furnace. The steel was clean and fine grained. The plate was carburized to a depth of 0.010 inch on one face and was quenched and tempered; the case and core hardnesses were 626 and 522 Vickers, respectively. The core tensile properties were normal and the core V-notch Charpy impact results high for this steel at this hardness. The fact that the armor plate of the "Frank" was more highly alloyed than that of the "Lily 2" previously examined (See OSRD Rept 4914, PB 22323), and that the hardness and physical properties of both plates were similar would point to waste in the use of alloying elements. Discussion of economic considerations and of findings, a photograph, and tabulated data are included in this report prepared at the Battelle Memorial Institute.

PB 22313. GRENELL, L. H. and others. Examination of enemy material: Metallurgical examination of Japanese aircraft armor plate. Progress report 148, Dec 11, 1944. (OSRD Rept 4697) Jan 1945. 7 p. Price: Microfilm-50¢ - Photostat-$1.00
The two pieces of Japanese armor plate examined were of the homogeneous type and were manufactured by cross-rolling basic open-hearth medium C, Ni-Cr-Mo steel ingots. The steels used

were clean and fine-grained. The plates were heat treated by either normalizing or oil quenching and tempering to produce microstructures of tempered martensite with hardnesses averaging 575 Vickers. The tensile properties, in general, were high, and the tensile reduction of area values were particularly high for the hardnesses involved. In all the steels, chemical compositions suggest a trend toward economy in nickel by using higher manganese and molybdenum, together with chromium. Discussion of findings, photographs, and tabulated data are included in this report prepared at the Battelle Memorial Institute.

PB 22613. GRENELL, L. H. and others. Examination of enemy materiel (OD-113): A metallurgical examination of a Japanese four-barrel carburetor. Progress report 34, Dec 30, 1943. (OSRD Rept 3182; War Metallurgy Committe Rept M-206) Jan 1943. 13 p. Price: Microfilm-50¢ - Photostat-$1.00
The examination of the various carburetor parts showed that only a few types of alloys were used. The aluminum carburetor and boost control bodies were made from an alloy similar to Alcoa-108. All of the brass parts examined were of a leaded 60% Cu-40% Zn type of alloy. Of special interest were the high-chromium steel throttle shaft and float valve needle. Steels of this type, especially the high-carbon float valve, are difficult to manufacture, fabricate and heat treat. The valve was differentially hardened, having a hardness of 448 V. H. N. at the valve end and 240 V. H. N. at the stem end. The hardness was obtained either by flame or induction heating, oil quenching, and probably tempered. A chromium electroplate, 0.0002 inch thick, was found on the wearing surfaces of the float valve and on the pistons in the boost control. No evidence of any type of anodic treatment was found on the aluminum, although all of the exposed ferrous parts and some of the brass parts were cadmium plated. Table 1 lists the parts as to name and type of alloy, while Table 2 gives the compositions of these parts. Photographs are included.

PB 22610. GRENELL, L. H. and others. Examination of enemy materiel (OD-113): A metallurgical examination of three Japanese 75 mm. high-explosive shells and carrier. Progress report 27, Dec 1, 1943. (OSRD Rept 3127) Jan 1944. 40 p. Price: Microfilm-50¢ - Photostat-$3.00
Investigation of these Japanese shells at Battelle Memorial Institute revealed that all of the steel parts of these rounds were made of plain carbon steel melted in a basic open hearth furnace. The high percentages of the residual elements indicated that scrap metal formed a considerable portion of the charge. Tensile data showed that the logitudinal and transverse mechanical properties were similar at various positions on the projectile bodies. The steel cartridges cases were cold drawn and machined from low carbon steel in the customary manner. The rotating bands were fabricated from electrolytic copper strip and seated on knurling of unusual type for the Japanese. The sheet used in the body of the ammunition carrier contained more carbon than is usually found in steel for this application. Further description, discussion of findings and economic considerations, photographs, microphotographs, and tabulated data are included in this report.

PB 22503. GRENELL, L. H. and others. Examination of enemy materiel (OD-113): Metallurgical examination of a Japanese rifle 6.5 mm (caliber .25), 38th year, pattern M1905. Progress report 42, Feb 7, 1944. (OSRD Rept 3418; War Metallurgy Committee Rept M-236) Mar 1944. 13 p. Price: Microfilm-50¢ - Photostat-$1.00
This Japanese Arisaka rifle was examined for treatment and quality of materials, method of manufacture, and quality of workmanship. No unusual or outstanding features were revealed. Photographs and charts appear in the appendix.

PB 22534. GRENELL, L. H. and others. Examination of enemy materiel (OD-113) (AC-77): Metallurgical examination of a Japanese aircraft 12.7 mm 'Browning' machine gun. Progress report 112, Aug 16, 1944. (OSRD Rept 4178; War Metallurgy Committee Rept M-376) Sep 1944. 22 p. Price: Microfilm-50¢ - Photostat-$2.00
Seventeen percent of the metal parts used in the manufacture of the Japanese "Browning" 50 caliber machine gun were made from tungsten steel, and the remainder were unalloyed. The steels were made in the basic open hearth or electric furnace with graded scrap forming a large part of the charge. The weapon was copied from an early American model with minor modifications. Heat treatments were simpler than American practice and flame hardening was used extensively. An interesting feature was chromium plating in the bore of the barrel. Photographs and tables of test data illustrate the report.

PB 22522. GRENELL, L. H. and others. Examination of enemy materiel (OD-113) (AC-77): Metallurgical examination of a Japanese army 105 mm H.E. shell of 1938. Progress report 96, Jul 25, 1944. (OSRD Rept 4071; War Metallurgy Committee Rept M-355) Aug 1944. 10 p. Price: Microfilm-50¢ - Photostat-$1.00
This Japanese high explosive projectile displayed no metallurgical features of unusual significance. Outstanding features are the mode of attachment of the rotating band, the eccentric machining of the body nose, the careful forging of the body and the variation in the properties of the body. Photographs and tables appear in the appendix.

PB 22511. GRENELL, L. H. and others. Examination of enemy materiel (OD-113) (AC-77): Metallurgical examination of a Japanese rifle 7.7 mm (caliber .303"), model 99. Progress report 52, Mar 31, 1944. (OSRD Rept 3625; War Metallurgy Committee Rept M-268) May 1944. 16 p. Price: Microfilm-50¢ - Photostat-$2.00
Examination showed that heat-treated, unalloyed, medium, and high carbon steels were used extensively in this rifle. Some of the parts were case hardened. The barrel and breech were quenched and drawn to sorbitic microstructure, and the trigger and bayonet were differentially hardened, showing martensitic to sorbitic structure. Sheet metal stampings were used extensively and fabricated into sub-assemblies by spot welding, fusion welding, soldering, riveting, and crimping, with emphasis placed on spot welding. Poor tooling and hand fitting of some parts indicate inferior workmanship. The wood stock and forearm were light in weight and showed a tendency to splinter. Photographs and a table of test data illustrate the report.

PB 22620. GRENELL, L. H. and others. Examination of enemy materiel (OD-113; AC-77): A metallurgical examination of a Japanese 20 mm. aircraft machine gun. Progress report 94, Jul 24, 1944. (OSRD Rept 4064) Aug 1944. 11 p. Price: Microfilm-50¢ - Photostat-$1.00
The various parts of the gun were made by conventional methods. Numerous high alloy steels were used throughout the gun, and parts subject to wear were made from high tungsten steel with the wearing surfaces flame hardened. The majority of the parts were either machined or forged. Very few stampings were used. The weights, hardness, heat treatment, and method of manufacture are given in Table 1; chemical and spectrographic analyses of selected parts Table 2. Photographs are included.

PB 22520. GRENELL, L. H. and others. Examination of enemy materiel (OD-113) (AC-77): A metallurgical examination of four Japanese 47 mm armor-piercing, high-explosive shells. Progress report 89, Jul 18, 1944. (OSRD Rept 4062; War Metallurgy Committee Rept M-349) Aug 1944. 17 p. Price: Microfilm-50¢ - Photostat-$2.00
Japanese 47 mm armor-piercing, high-explosive shells were found to be made with all major ferrous parts of plain carbon steel with no indications of any intentional additions of alloying elements. The unusual residual metals in Japanese steel, including high tin, were present. The only heat-treated ferrous parts were the projectiles in which the ogive and nose were hardened to a depth of a quarter of an inch by differential quenching. Except for the firing pin delay spring, all ferrous parts were machined from bar stock. The cartridge case had no unusual features. Its composition was, as is common in Japanese cases, 62½% copper and 37% zinc.

Brass parts which contact the explosive charge were coated with a clear phenolic lacquer to prevent a reaction between the metal and the explosive. Pure electrolytic copper was used for the rotating band. Photographs and tables illustrate the report.

PB 22515. GRENELL, L. H. and others. Examination of enemy materiel (OD-113) (AC-77): Metallurgical examination of Japanese 81 mm high explosive light mortar shell complete with type 93 fuze. Progress report 87, Jun 27, 1944. (OSRD Rept 3966; War Metallurgy Committee Rept M-339) Jul 1944. 9 p. Price: Microfilm-50¢ - Photostat-$1.00

No outstanding metallurgical features were found in the shell examined, although the body was excellently forged. There are photographs. Chemical analysis of parts appears in the appendix.

PB 22531. GRENELL, L. H. and others. Examination of enemy materiel (OD-113) (AC-77): Metallurgical examination of two Japanese 140 mm naval projectiles. Progress report 114, Aug 16, 1944. (OSRD Rept 4131; War Metallurgy Committee Rept M-372) Sep 1944. 14 p. Price: Microfilm-50¢ - Photostat-$1.00

The steel parts of these inert Japanese 140 mm bombardment, high-explosive shells were manufactured from silicon killed, medium (.45%) carbon, nickel, nickel-chromium, and nickel-chromium-molybdenum steels made in the basic open hearth furnace. The residual content of copper and tin indicates that graded scrap formed a large part of the furnace charges. The shells were heat treated to a uniform low hardness level. Fuses, rotating bands, and washers were made by standard methods. Tin and organic coatings were used to prevent corrosion. Tables and photographs illustrate the report.

PB 22395. GRENELL, L. H. and others. Examination of enemy materiel (OD-113; AC-77; M-119): Metallurgical examination of 5-inch Japanese naval projectile. Progress report 176, Apr 20, 1945. (OSRD Rept 5135) May 1945. 6 p. Price: Microfilm-50¢ - Photostat-$1.00

This report, from the Battelle Memorial Institute, presents the results of a metallurgical examination of a 5-inch Japanese naval shell to determine the type of material, method of manufacture, and heat treatment. The projectile was forged from silicon-killed steel similar to SAE 5150, which was heat treated by partial spheroidizing. It had been machined inside and out, and painted for corrosion protection. The shell-case was deep drawn from 70-30 brass, and had been mouth-annealed, and the interior surface coated with black asphaltic coating. The rotating band was fabricated from seamless tubing made from electrolytic copper, and was placed on the shell with circumferential pressure. The projectile had been forged by standard methods. A short discussion of the examination of the projectile is followed by a table of the details of manufacture, markings and type of material of each numbered part shown on an appended photograph.

PB 22378. GRENELL, L. H. and others. Examination of enemy materiel (OD-113; AC-77; M-119): Metallurgical examination of Japanese army 47 mm. H. E. projectiles. Progress report 131, Oct 7, 1944. (OSRD Rept 4366) Nov 1944. 10 p. Price: Microfilm-50¢ - Photostat-$1.00

The projectile body of this Japanese high explosive ammunition examined at Battelle Memorial Institute was manufactured from normalized silicon-killed medium carbon steel, probably made in the basic open-hearth furnace. The steel was classed as dirty with numerous sulfide stringers present. The cartridge cases were 62.1% Cu, 37.3% Zn brass, made by the usual process of deep drawing. This report includes photographs and tables giving analyses of shell parts and details of manufacture.

PB 22008. GRENELL, L. H. and others. Examination of enemy materiel (OD-113)(AC-77)(M-119): Metallurgical examination of Japanese 47 mm antitank gun. Progress report 181, May 1, 1945. (OSRD Rept 5227; War Metallurgy Committee Rept M-543) Jun 1945. 36 p. Price: Microfilm-50¢ - Photostat-$3.00

Low- and medium-carbon steels without alloys or heat treatments were used extensively in this weapon. None of the parts had carburized cases. Sheet and plate were used to advantage by welding and riveting into subassemblies. Welding technique was poor but adequate. Most of the forgings were annealed or left in the "as-forged" condition. Poor tooling and hand fitting of some parts indicated inferior workmanship. The gun tube and breech ring were forged, slack quenched and tempered to a relatively low hardness. Physical properties and hardenability of the steel used for these vital parts were low compared to American and German practices. Aluminum in the large springs was probably used for grain size control. A cross-section drawing of the gun tube photographs, graphs, and tables are included.

PB 22692. HENDERSON, A. S., and others. Examination of enemy materiel (OD-113): Metallurgical examination of miscellaneous Japanese articles. Progress report 11, Jul 18, 1943. (OSRD Rept 1695) Aug 1943. 8 p. Price: Microfilm-50¢ - Photostat-$1.00

Three Japanese articles were examined and found to be somewhat different from conventional American practice. The aluminum object appeared to be a threaded cup drawn from commercial aluminum sheet. Although the aluminum appeared to be unalloyed in the conventional sense, it contained 1.1% iron. Since the part would not be required to withstand corrosion and needed no extra physical properties, the possibility exists that the high-iron aluminum, obtained from the electrolytic cells when starting production, was used as the melting stock for the fabrication of this sheet with or without diluting with low-iron aluminum. As in American practice, the electric cord was insulated with two layers of rubber material separated by a matted cotton fabric. The portion next to the copper wire was compounded, carbon free while the outer rubber insulating material contained 23.8% carbon by weight. This cord should be effectively insulated by this method; however, for heavy use, the carbon content in the exterior rubber compound probably is too high for best performance. The bakelite and brass plugs connected to the cord were manufactured in the conventional manner. Of considerable interest was the adaptation of wire, which was not homogenized by patenting, in the fabrication of the Japanese rubber tires. Probably this wire was drawn from medium carbon-steel bar stock in the conventional manner, except that no attempt was made to homogenize the structure as is customary in American practice. Photographs are included.

PB 22612. MIKHALAPOV, G. S. and HOGLUND, G.O. Examination of enemy materiel (OD-113): Examination of a joint on a Japanese gasoline tank. Progress report 36, Jan 7, 1944. (OSRD Rept 3181; War Metallurgy Committee Rept M-208) Jan 1944. 5 p. Price: Microfilm-50¢ - Photostat-$1.00

The joint was examined for design, method, and materials. It was found to be welded on preformed edges and backed up by brazing or welding with a silicon-aluminum alloy. A photomicrograph of the weld is attached to the report.

United States

PB 20210. BERRY, J. M. and others. Investigation of boron in armor plate (OD-87): Endurance and other properties of some boron-containing carbon steels and NE 9400 type steels. Final report, Feb 15, 1945. (OSRD Rept 4995; War Metallurgy Committee Rept M-506) Apr 1945. 34 p. Price: Microfilm-50¢ - Photostat-$3.00

Seven commercial steels from a series of boron-containing carbon and Ne 9400 type compositions were examined for grain size and normality, inclusion rating, hardenability, tensile properties, and endurance properties, at Battelle Memorial Institute. The McQuaid-Ehn grain size and the austenitic grain size, using the delayed quenching technique, were determined, as well as the fracture grain size. The correlation between the fracture grain size and the austenitic grain size was not good. Because companion steels without boron were not included in the program, the effect of boron on the

hardenability of the steels could not be determined. Two steels of the SAE 1345 type were tested in fatigue in the unnotched condition after oil quenching and tempering at 460° F., and they were assigned endurance limits of 125,000 p.s.i. and 130,000 p.s.i. The description of the experimental work and discussion of results is accompanied by tabulated data, diagrams of fatigue and tensile specimens, and hardenability and stress curves. See also PB 20211-20213.

PB 20212. BOSTON, O. W. and others. Investigation of boron in armor plate (OD-87): Machinability evaluation by cutting-speed tool-life tests of three steels, each in three annealed structures. Progress report, Aug 10, 1944. (OSRD Rept 4102; War Metallurgy Committee Rept M-365) Sept 1944. 22 p. Price: Microfilm-50¢ - Photostat-$2.00
Machinability tests on samples of heat-treated boron containing steels from two ingots of the U. S. Army Ordnance Special Addition Agent Heat No. 126405 and on samples of a heat-treated steel of SAE 4145 grade were made at the University of Michigan for Battelle Memorial Institute. The results of these tests, the object of which was to determine the cutting-speed tool-life relationship when turning each steel with high speed steel tools cooled with an emulsion, are presented in this report. Each of the three steels was furnished in three structures:- 100% pearlitic, 50% pearlitic and 50% spheroidal, and 100% spheroidal. Tables showing the results of the tool-life cutting speed tests for these steels when using both light and heavy feeds are given, together with data on hardness and annealing treatments and plotted curves. See also PB 20210-20211 and PB 20213.

PB 18876. BRIDGMAN, P. W. Distortion of an armor plate steel under simple compressive stress to high strains. (OSRD Rept 3019; NDRC Armor and Ordnance Rept A-335) Dec 1943. 19 p. Price: Microfilm-50¢ - Photostat-$2.00
The relation between stress and strain for simple compressive stress has been determined for an armor plate steel using the method (See Proc. Roy Soc. 143,333 (1933-34), in which compression is applied in stages with reshaping between stages in order to keep the ratio of length to diameter large and eliminate error due to friction on the ends which would introduce other components of stress. The final strain corresponded to a reduction of length to 5 percent of its initial value. Tests were made on specimens cut in three different directions from a particular plate. Between natural strains of 0.5 and 3.0, the compressive stress increases linearly with natural strain, reaching at the maximum strain a value of approximately 17,000 kg/cm^2. The three different orientations gave the same results. These results differ qualitatively from those for copper obtained by Taylor and Quinney who found that the compressive stress reaches a limit value with large strains. Their work on copper was repeated and checked. Tables and graphs are included.

PB 18875. BRIDGMAN, P. W. The effect of cold-working on the ballistic properties of steel plate. (OSRD Rept 1429; NDRC Armor and Ordnance Rept A-177) May 1943. 10 p. Price: Microfilm-50¢ - Photostat-$1.00
Pieces of a 1045 steel armor plate 3 in. square and 0.25 in. thick have been subjected to two types of cold-working, both of which increase the thickness of the plate. The first is a bending followed by a flattening, which is applicable only to the softer grades of steel. The Brinell hardness may decrease after this type of cold-work. The second type of cold-work is by a straight lateral push, which always increases the Brinell hardness. After cold-working, the plates were tested ballistically, as were also a number of untreated control plates. It was found that in all cases the ballistic performance of the plate is a function only of the Brinell hardness, irrespective of whether this hardness has been attained by cold-work or by heat treatment. In particular, the critical hardness limit at which brittleness appears is independent of the method by which hardness has been attained. Since it is much cheaper to produce a given hardness in steel by heat treatment than by cold-work, it would appear that there is no practical advantage in cold-working steel plates. If, however, the armor is of a metal that cannot be hardened by heat treatment, the possibility must be kept in mind of improving its ballistic performance by suitable cold-work. Tables, drawings and graph are included.

PB 18872. BRIDGMAN, P. W. Plastic deformation of steel under high pressure: Second progress report. (OSRD Rept 1347; NDRC Armor and Ordnance Rept A-162) Mar 1943. 35 p. Price: Microfilm-50¢ - Photostat-$3.00
In continuing the work which was started in an earlier report (OSRD Rept 919) it was concluded that for grades of armor plate of the general range measured, the Brinell hardness may be expected to increase under pressure of 10,000 kg/cm^2 about 5%. The natural strain at which fracture occurs was found to be a linear function of the pressure. The effect of pressure in increasing elongation before fracture varies with the grade of steel and does not follow the same order as normal tensile strength or hardness. The variation in the factor of elongation produced may be enough to result in significant differences in ballistic behavior. One plate was studied for the effect of orientation on tensile properties. Curves illustrate the report. The appendix contains a description of the apparatus and the methods used in the tests. This work was carried out and reported by Harvard University under NDRC contract.

PB 19817. CHIPMAN, JOHN and KAUFMAN, A. R. Ballistic tests on some experimental non-magnetic steels for armor plate. Progress report. (OSRD Rept 480; War Metallurgy Committee Rept M-2) Mar 1942. 21 p. Price: Microfilm-50¢ - Photostat-$2.00
This report contains tabulated data on ballistic limits, physical and magnetic properties of 167 pieces of experimental nonmagnetic armor plate steel of 3/8 inch thickness. In no case is the ballistic limit quite as high as in good homogeneous armor. Penetration resistance is improved by cold rolling which in most cases gives rise to a slight increase in magnetic permeability. Tempering at any temperature fails to improve and often lowers the ballistic properties. Tables and photographs are included.

PB 19816. CHIPMAN, JOHN and others. Non-magnetic steels for armor plate (AC-6). Final report, Jul 31, 1942. (OSRD Rept 822; War Metallurgy Committee Rept M-14) Aug 1942. 104 p. Price: Microfilm-$1.50 - Photostat-$7.00
A project on the development of nonmagnetic steels suitable for use as light-gage armor in the vicinity of magnetic compasses was undertaken by the Massachusetts Institute of Technology at the request of the National Defense Research Committee. A survey of existing information indicated that four classes of nonmagnetic alloys deserved consideration: Duralumin, copper-base alloys, austenitic stainless steels including high nickel alloys, and high manganese austenitic steels. This report details the method of preparation, ballistic data, and the effects of heat treatment, cold working and chemical composition on the ballistic properties. Weight for weight, duralumin compares favorably in ballistic properties with the other materials, but its other wartime applications make it unavailable for armor. Among the copper alloys, even hardened beryllium-copper has unattractive ballistic qualities. In the austenitic category, the stainless steels and high nickel alloys are more expensive, more strategic, and have lower penetration resistance than the 12-14% Mn steels of the Hadfield type. Consequently, the latter steels were regarded as the most promising class of alloys for the problem at hand. Appendices cover the following subjects: I. Preparation of the steels; II. ballistic testing equipment; III. ballistic test results; III A. ballistic tests made at Naval Proving Ground; IV. effect of heat treatment on ballistic properties; V. effect of cold rolling on ballistic properties; VI. effect of composition on ballistic properties; VII. machinability testing of 12-14% manganese steels; VIII. welding tests on 12-14% manganese steels; IX. effect of surface hardening on the ballistic properties of 12-14% manganese steels. Tables, graphs and photographs are included.

PB 20227. CLARK, D. S. and others. Behavior of metals under dynamic conditions (WB-109): Mechanics of the dynamic performance of metals. Progress report, Sep 1, 1944. (OSRD Rept 4343; NDRC Rept 18:36; War Metallurgy Committee Rept M-385). Nov 1944. 105 p. Price: Microfilm-$1.50 Photostat-$7.00

The purpose of this report prepared at the California Institute of Technology is to provide a basis for an understanding of the principles of strain propagation in relation to the general field of the dynamic performance of metals and alloys. The general problem of dynamic loading is discussed, leading to a detailed consideration of strain propagation in the elastic and plastic states. Methods of analysis are presented with typical elementary applications. Some of the fundamental experimental work is described. The problem of rate of strain is discussed in relation to the impact problem and the behavior of beams and plates under impact is presented. The theoretical discussions are illustrated by numerous diagrams, and a bibliography is included.

PB 19512. DORN, JOHN E. Properties and heat treatment of magnesium alloys. Progress report, Nov 7, 1942. (OSRD Rept 1099; War Metallurgy Committee Rept M-28) Dec 1942. 66 p. Price: Microfilm - $1.00 - Photostat-$5.00

This is a report of research work on magnesium alloys at the University of California. In the first part of the experiments, specimens of AMS 4351 alloy were examined, the results indicating that tensile strength and yield strength decrease slightly with increasing sheet thickness. Percent elongation is possibly independent of sheet thickness. Specimens of AMS 4351 alloys were tested for notch sensitivity and a maximum of 15% reduction in tensile strength for specimens with one central hole was found. It was found that SAE 520 alloy had a high damping capacity. Twinning occurred at stresses exceeding 3,300 psi in shear. A proposed program for the study of heat treatment of magnesium alloys is outlined and a brief description of four salt bath furnaces which had been constructed is given. Tables of results, photomicrographs, drawings of equipment, and a photograph of the Norton damping capacity testing machine are included. See also PB 19511 and PB 19513.

PB 20518. DUFFNER, R. L. Lead-base bearing alloys: Abstracts of literature. Second report. (Frankford Arsenal Ordnance Lab Rept R-348) Sep 1942. 24 p. Price: Microfilm-50¢ - Photostat-$2.00

Abstracts of the available literature on lead-base bearing metals listed in the bibliography of Frankford Arsenal report R-219 are assembled in this report, listed alphabetically by author. The sources of these abstracts are: (1) Chemical abstracts, (1927-1942); (2) Metallurgical abstracts, Institute of Metals, London (1934-1940); (3) Engineering Index, (1917-1941); (4) W. M. Corse - Bearing Metals and Bearings, Reinhold Publishing Co., New York (1930). In addition to the foregoing sources, the staff of this laboratory abstracted literature referred to in Industrial Arts Index and literature in the more recent periodicals subscribed to by Frankford Arsenal Library.

PB 18885. DUWEZ, PCL E. Preliminary experiments on the propagation of plastic deformation, a revision of NDRC Report A-33 (OSRD No. 380). (OSRD Rept 3307; NDRC Armor and Ordnance Rept A-244) Feb 1944. 23 p. Price: Microfilm-50¢ - Photostat-$2.00

Von Kármán developed a theory of the propagation of plastic deformation in solids that may open the way to a systematic interpretation of a great many impact and penetration problems in which plastic deformation of beams, plates and armor are involved. This report describes experiments that have been made with the object of testing the assumptions of the theory and that provide data on: (1) The existence of a plastic wave front of a given amplitude; (2) the relation between the velocity of impact and the amplitude of the plastic wave front; and (3) the shape of the plastic wave and the velocity of propagation of the plastic front. The experiments show that the theory is able to describe, along general lines, the process of the propagation of deformation of solids. In particular, the theoretically predicted relation between the velocity of impact and the resulting maximum plastic deformation checks quite well with the experiments. The actual shape of the plastic wave is found to be at some variance with the theoretically obtained curves and, hence needs further explanation. Curves illustrate the report. This work was carried out and reported by the California Institute of Technology under NDRC contract.

PB 20206. DUWEZ, P. E. and CLARK, D. S. Behavior of metals under dynamic conditions (No-11) (NS-109): Influence of impact velocity on the tensile properties of some metals and alloys. Progress Report, Apr 15, 1944. (OSRD Rept 3837; NDRC Rept 18:32; War Metallurgy Committee Rept M-288) Jun 1944. 40 p. Price: Microfilm-50¢ - Photostat-$3.00

The influence of impact velocity on the tensile properties of metals and alloys had been the subject of an investigation at California Institute of Technology for several years during which testing methods and equipment were developed by which it was possible to study the force acting on a specimen as a function of time during a tensile impact test. In 1941 Th. von Karman presented a theory on the propagation of plastic strain leading to an interpretation of force-time diagrams obtained in tensile impact tests which has been proved valid. During the two years previous to the date of this report, the testing methods previously developed and von Karman's theory and its extensions have been utilized on behalf of the National Defense Research Committee in the investigation of many metals and alloys of importance to industry and the armed services. The purpose of this report is to summarize the results of these investigations in so far as they related to the tensile properties of the metals and alloys studied. The information is giving under the headings: Types of force-time relations, the variation of ultimate strength with impact velocity, the variation of percentage elongation with impact velocity, ultimate strength, percentage elongation, energy absorbed for rupture, and general remarks on the influence of impact velocity on the tensile properties of ferrous alloys and of nonferrous metals and alloys. The report includes tabulated data, a bibliography, drawings of testing equipment, stress-time diagrams, and plotted curves.

PB 20225. DUWEZ, P. E. and others. Behavior of metals under dynamic conditions (NS-109): Progression of yielding. Progress report, Oct 15, 1944. (OSRD Rept 4453; NDRC Rept 18: 37; War Metallurgy Committee Rept M-409). Dec 1944. 10 p. Price: Microfilm-50¢ - Photostat-$1.00

The results of cursory tests made at the California Institute of Technology give preliminary evidence that in tensile tests on cylindrical specimens of an SAE 1015 steel in which the traction velocity is very low, yielding progresses in jumps and that the strain associated with these jumps is essentially the strain indicated by the end of yielding on the usual static stress-strain diagram. Therefore, it is concluded, the measurements of minimum plastic strain reported in tensile impact data (which corresponds to the end of the static yield) is not different from that observed in the static test provided the strain is measured over a small increment of the gage length. The scope of these tests was insufficient to establish an exact relation between the velocity of traction and the rate of progression of yield along a specimen. A drawing showing the location of the resistance sensitive electric strain gages on the specimens when tested and stress-strain curves are included.

PB 20217. DUWEZ, P. E. and others. Behavior of metals under dynamic conditions (NS-109): The influence of hardness and type of heat treatment on the static and impact tensile properties of an SAE 4340 steel. Progress report, Dec 26, 1944. (OSRD Rept 4775; NDRC Rept 18:43; War Metallurgy Committee Rept M-462) Feb 1946. 26 p. Price: Microfilm-50¢ - Photostat-$2.00

The results of an investigation of the tensile properties of an SAE 4340 steel under static conditions and at an impact velocity of about 100 ft/sec when treated by different methods to obtain a range of hardness values is presented in this report which was prepared at the California Institute of Technology. The treatments used include annealing, quenching and tempering, martempering, and austempering. These studies are of interest in connection with the use of this material under dynamic conditions for certain applications concerning Naval ordnance equipment. The results indicate that the values of ultimate strength are greater when determined at an impact velocity of about 100 ft/sec than under static conditions. The values of ultimate strength for a given hardness value are the same for the three types of hardening methods. The energy absorbingcapacity of this steel under dynamic conditions may be greater when treated by martempering or austempering for a hardness of about 48 Rc. while at

lower hardness values either quenching and tempering or martempering may give slightly better energy absorbing capacity. The report includes tabulated results of tests, photomicrographs, and plotted curves.

PB 22586. GRENELL, L. H. and others. Examination of enemy materiel (OD-113): A metallurgical examination of a Japanese 75 mm. high explosive shell. Progress report, May 14, 1943. (OSRD Rept 1500; War Metallurgy Committee Rept M-90) Jun 1943. 17 p. Price: Microfilm-50¢ - Photostat-$2.00
A Japanese 75 mm. H. E. shell was examined and found to contain several semileaded brass parts. The shell was manufactured in the customary manner and no new alloys were used. Photographs and tables are included.

PB 22685. GRENELL, L. H. and others. Examination of enemy materiel (OD-113): Chemical and metallurgical examination of three German bomb fragments. Progress report, May 17, 1943. (OSRD Rept 1499; War Metallurgy Committee Rept M-89) Jun 1943. 8 p. Price: Microfilm-50¢ Photostat-$1.00
A metallurgical and chemical analyses were made on three bomb fragments and results presented in tabular form. One fragment was obtained from one of the fuse components and was composed of aluminum; the other two fragments were steel. Photographs are included.

PB 30201. HESS, ALBERT and others. Behavior of steel under conditions of multiaxial stress and the effect on this behavior of metallographic structure and chemical composition (NS-307): Tests of small tubular specimens. Final report, Dec 1945. (OSRD Rept 6593; War Metallurgy Committee Rept M-644) Feb 1946. 72 p. Price: Microfilm-$1.00 - Photostat-$5.00
This final report describes and summarizes the results of tests on thirty-four thin-walled tubes, of 3 inch bore and (except for two tubes) 1/4 inch wall thickness. All tubes were machined from solid bar stock. Also included are supplementary data on properties of this steel when subjected to bending test in the form of 1/4 inch plates, both welded and unwelded, cut from the bar stock. Description of additional tests on eight tubes at various low temperatures are given in this report. The true stresses at fractures of this material increased continually throughout the decreasing range of temperatures down to -90° F., at which temperature a marked decrease in fracture strength occurred. The structural strength of the tubes increased continually down to and including the lowest temperature used. This report prepared at the Illinois Institute of Technology discusses results of these tests, gives conclusions, and includes photographs, stress-strain curves, tabulated data and a short bibliography.

PB 19828. HESS, W. F. and others. Spot-welding of magnesium alloys: Part I - The surface treatment of magnesium alloy sheet for spot-welding. Final report, Aug 1944. (OSRD Rept 4955; War Metallurgy Committee Rept M-374) Apr 1945. 101 p. Price: Microfilm-$1.50 - Photostat-$7.00
The results of investigations of chemical and mechanical surface treatments for cleaning magnesium alloy sheet preparatory to spot-welding are presented in this report prepared at Rensselaer Polytechnic Institute. The research was directed toward the development of a single solution to clean all varieties of stock at room temperature. The treatments developed were studied from the viewpoint of the characteristics of both the solutions used and the surfaces produced. Direct comparisons were made between the properties of surfaces cleaned chemically and by wire-brushing in order to establish the relative merits of the chemical and mechanical methods of preweld preparation. Tables of test results, plotted curves, a bibliography, and appendices showing composition limits of magnesium alloy sheet of two producers, and the theoretical and experimental analytical relationships in CrO_3 and CrO_3-Na_2SO_4 solutions are included. For Part II see PB 19827.

PB 18883. HYERS, D. H. On the static and dynamic plastic bending of plates. (OSRD Rept 2018; NDRC Armor and Ordnance Rept A-228) Nov 1943. 26 p. Price: Microfilm-50¢ - Photostat-$2.00
A theoretical study has been made of the plastic bending of a circular plate under both static and impact loading at the center. The results for the static case are compared with those of experiments. In the dynamic case, the radius of the plate is taken as infinite and the hammer producing the impact is assumed to travel with a constant velocity v_1. The law of propagation of bending strains is found to be similar to that for long beams. An explicit solution is found for the case of low impact velocities v_1, and a comparison is made between the plate and beam problems. Curves illustrate the report. The appendix contains a glossary of principal symbols used in the report. This work was carried out and reported by the California Institute of Technology under NDRC contract.

PB 19517. JACKSON, L. R. and others. Fatigue properties of magnesium alloys and structures: Fatigue properties of magnesium alloy sheet - Part I (MA-145). Final report Aug 31, 1943. (OSRD Rept 3033; War Metallurgy Committee Rept M-169) Dec 1943. 145 p. Price: Microfilm - $1.50 - Photostat - $10.00
This is a summary report of work done during 1943 at Battelle Memorial Institute in the investigation of some of the fatigue properties of magnesium alloys of possible use in aircraft manufacture. Downetals J-1b, J-1a, FS-1h, FS-1a, Mh and Ma were tested in sheet form. Joints (spotwelded, riveted, cyclewelded, and Heliarc-welded) were investigated for the materials J-1h, J-1a, and Mh. The results afford a fairly broad survey of tension-tension fatigue strengths for the materials and types of joints tested. This report presents, in summary form, all of the test results previously reported (See PB 19520-19522), together with occasional additional data, and offers conclusions from these tests results. Photographs of welds, numerous plotted curves and tables of results accompany the report. See also PB 19518-19522.

PB 19518. JACKSON, L. R. and others. Fatigue properties of magnesium alloys and structures: Fatigue properties of magnesium alloy sheet - Part II (MA-145). Final report, Mar 1, 1944. (OSRD Rept 3792; War Metallurgy Committee Rept M-289) Jun 1944. 89 p. Price: Microfilm - $1.00 - Photostat - $6.00
The results of fatigue studies of FS-1 and of AMC52S magnesium alloy sheet, corrosion fatigue studies of FS-1 and of AMC52S in salt solutions (with and without chromate inhibition) and preliminary fatigue studies of AMC52S-H, J-1h, and AMC57S-H sheet after precipitation heat treatment are given in this report prepared at Battelle Memorial Institute. All tests showed a decrease in fatigue strength due to corrosion. Photomicrographs, fatigue curves, corrosion fatigue curves, drawings and photographs of equipment, a short bibliography, and appendices giving tables of fatigue test results and data on measurements of weight loss during corrosion are included in this report. See also PB 19517 and PB 19519-19522.

PB 22675. KYLE, PETER E. Correlation of information on the production and properties of magnesium alloy castings and forgings: General problems associated with the production, properties and uses. Advisory report, Jul 19, 1944 (War Metallurgy Committee Res Rept M-140) Aug 1944. 6 p. Price: Microfilm - 50¢ - Photostat - $1.00
This report summarizes a survey of the needs of magnesium alloy producers for information on the production and properties of magnesium alloy castings and forgings. This survey led to the establishment of three War Production Board research problems as follows: Cast magnesium alloys - existing foundry techniques and practices to be undertaken at Battelle Memorial Institute; control of grain structure and its effect on quality of magnesium alloy castings, at the University of California; and production and properties of magnesium alloy press and hammer forgings, at Wyman-Gordon Company. Specific points on which information was

needed are listed in summary of survey. The most serious situation in the magnesium alloy casting industry came as a result of the inability of foundries new at casting these alloys to produce sound castings consistently. The most important problems in the magnesium alloy forging field centered around the shortage of forging capacity for small forgings, lack of capacity for large forgings, and insufficient data on properties of large forgings.

PB 25777. MATTSON, R. L. and FONDA, H. E. Effect of shot blasting on the mechanical properties of steel (NA-115): Part III. Final report, Oct 1, 1944-Feb 28, 1946. (OSRD Rept 6647; War Metallurgy Committee Rept M-661) Apr 1946. 263 p. Price: Microfilm-$3.00 - Photostat-$18.00
This is the third and last part of a final report on work in progress for about three and one-half years pertaining to the development and application of shot peening and other prestressing processes. This was a cooperative project in which about 135 industrial and research organizations took part in order to aid in overcoming failures in machine elements. The present part of the report, prepared at the Research Laboratories Division of General Motors Corporation covers particularly the last year and one half of the work. Most of the information pertains to the effect of shot peening on fatigue properties. There are some data on the effect of shot peening on the following properties: Static strength, impact strength, dimensions, hardness, stress corrosion cracking, general corrosion, surface failures, and residual stresses. Among the principal observations were: (1) Shot peening improves the fatigue properties of a large variety of machine elements involving various materials, heat treatments, surface conditions, fabricating processes and sizes of section, and numerous types of loading; (2) shot peening has in most cases little affect upon static strength; (3) the data available are not sufficient to determine the effect of shot peening on impact strength; (4) dimensions change slightly because of shot peening; (5) additional data are necessary to establish the effect of shot peening on hardness; (6) shot peening tends to inhibit stress corrosion cracking. A brief survey of the following is given: Shot peening equipment and procedure; shot size, quality, and measurement; hammer peening treatment and the pre-setting treatment; intensity measurement; and surface rolling treatment. Appended are studies on the residual stress in a torsion bar spring, and the effect of elevated temperatures on residual stresses in certain high temperature materials. A bibliography, drawings, photographs, charts, diagrams, graphs, and plotted curves are included. Indices to cases covered in this report and also to those in earlier reports are presented. See PB 19514 and PB 19515 for earlier reports on this investigation.

PB 19522. RUSSELL, H. W. Fatigue properties of magnesium alloys and structures: Fatigue properties of magnesium alloy sheet. Progress report, Dec. 7, 1942. (OSRD Rept 1146; War Metallurgy Committee Rept M-36) Jan 1943. 36 p. Price: Microfilm - 50¢ - Photostat-$3.00
An account of the development of testing techniques for magnesium alloy sheet and a description of tests results on Dow Metal J sheet in two thicknesses and in two hardness states (a and h) are given in the report prepared at the Battelle Memorial Institute. One of the purposes of the tests was to determine if there was what might be called a "thickness" effect in the strength of the alloy. The thin sheet was slightly stronger in both static and fatigue tests. However, the effect was so small the investigator did not feel justified in using it to make general statements. Both the Jh and Ja material behave like other structural alloys in that they are strengthened by understressing. Included are descriptions and photographs of testing equipment, a wiring diagram of a strain measuring bridge, photomicrographs, plotted curves showing stress-strain and fatigue strength, and tabulated data. See also PB 19517-19521.

PB 4401. SHODGRASS, T. J., JR. Comparison of physical properties when the same hardness is obtained by various temperature-time tempering cycles. (Rock Island Arsenal Lab Rept 44-5228) Mar 1945. 7 p. Price: Microfilm-50¢ - Photostat-$1.00
It was found that the tensile properties obtained were the same regardless of the various time-temperature tempering cycles to which the material was subjected. Izod impact values from the WD 1045 series were not affected by the various time-temperature tempering cycles. On air cooling Izod impact specimens from the temper the highest impact values for the WD 4140 steel were obtained with the highest tempering temperature and shortest holding time. When the impact specimens of WD 4140 were water quenched the two hour holding time and lower temperature tempering cycle gave the best results of the three treatments. The lowest results of the three treatments on WD 4140 and WD2340 were obtained with the six hour holding time and lowest temperature regardless of air cooling or water quenching from the temper. The best results in the WD 2340 series of impact values were obtained with the shortest holding time, high temperature cycle. Nearly all the Izod specimen values from the three steels were improved when water quenched from the tempering operation. The appendix contains two tables.

PB 19830. STOUT, R. D. and others. Methods of testing weldability of steel plates and shapes: Part I. Final report, Mar 1, 1944. (OSRD Rept 3702; War Metallurgy Committee Rept M-243) May 1944. 34 p. Price: Microfilm-50¢ - Photostat-$3.00
In an experimental program undertaken at Lehigh University, a test specimen was developed for comparing quantitatively the degrees of restraint at which a weld cracks during cooling in steel plates of various compositions when all other conditions are held constant. This comparison may be conducted at any level of plate thickness, rate of welding, or at any initial temperature. It may be made with any selected electrode. The test results are reproducible whenever the conditions are repeated, and they are sensitive to slight changes in the conditions of the test. This testing method can also be used to compare electrodes in terms of the restraint at which cracks occur with any chosen steel plate composition, and at any level of the other variables. The preheat level used seems to have a large influence on the restraint level at which cracking occurs whereas the rate of heat input in welding seems to be a minor factor. Tabulated data, a diagram showing the cracking tendency of various steels and electrodes, and photographs and drawings of specimens and testing equipment are included.

PB 22693. U. S. WAR DEPARTMENT. Drinking water tanks - lining and relining. (Tech Bul ORD 334) Mar 12, 1946. 8 p. Price: Microfilm-50¢ - Photostat-$1.00
The purpose of this bulletin is to provide information on the proper procedure for cleaning and treating the interior of steel drinking water tanks, in order to prevent contamination of drinking water by rust or other foreign materials, and deterioration of the tank. Subjects covered are, as follows: Baffle removal, choice of treatment, precautions, bituminous lining surface preparation, surface preparation of other linings, conditioning of sanded or sand-blasted surfaces, painting, and bill of materials, equipment and references. Photographs are included.

PB 22068. U. S. WAR DEPARTMENT. Reel units RL-31, RL-31-B and RL-31-C. (Tech Manual 11-363) Nov 1944. 31 p. Price: Microfilm-50¢ - Photostat-$3.00
Subject reel units are rugged, lightweight, portable units designed to facilitate paying out and recovering field wire and reels RD-4 and RD-5. This manual contains description, and instructions for installation, operation and maintenance. Supplementary data consist of maintenance parts list. Photographs and sketches are included.

PB 20871. U. S. WAR DEPARTMENT. QUARTERMASTER BOARD. Report of test of arrester, spark, QMB T-1473. (Project T-378) Sep 1944. 10 p. Price: Microfilm-50¢ - Photostat-$1.00
Seven types of galvanized iron spark arresters for use with QM tent stoves burning bituminous coal were tested to determine which is most practical.

PB 18878. WHITE, MERIT P. The failure of diaphragms under uniform pressure. (OSRD Rept 1376; NDRC Armor and Ordnance Rept A-167) Apr 1943. 38 p. Price: Microfilm-50¢ - Photostat-$3.00
The combination of hydrostatic stress with uniaxial stress and with pure shear results in those stress states that occur in pipes, cylinders and diaphragms under uniform pressure. By assuming that the hydrostatic stress does not affect the plastic stress-strain relation, one is able to predict the plastic behavior of such structures. The behavior of thin metal plates under undistributed pressure is of importance in aeronautical and naval design. Similarly, the cylinder under internal pressure is significant to designers of ordnance, particularly bombs and guns. Failure of a pipe or diaphragm may be initiated by localized flow or by rupture. The first depends on the balance between work hardening and the thinning produced by strain, the second on the cohesive strength of the material. For one-dimensional diaphragms and for tubes, the analysis can be completed with no difficulty, as is shown. For circular diaphragms the problem is more difficult on account of the nonuniformity of strain from center to edge. Certain conclusions are drawn and a method of calculation is outlined. Graphs and diagrams illustrate the report.

PB 18884. WOOD, D. S. and others. The influence of specimen dimensions and shape on the results of tensile impact tests. (OSRD Rept 3028; NDRC Armor and Ordnance Rept A-237) Dec 1943. 32 p. Price: Microfilm-50¢ - Photostat-$3.00
This report presents the results of a study at the California Institute of Technology on the influence of specimen length, diameter and cross-sectional shape on tensile impact tests. Part I deals with the effect of the ratio of length to diameter; Part II, with the effect of size in geometrically similar specimens, and Part III, with the influence of cross-sectional shape. Material used in Part I, was a cold-rolled steel; in Part II, this steel and annealed copper; in Part III, annealed copper. The results show that the effect of velocity on the tensile properties of metal is independent of both the dimensions and the cross-sectional shape of the specimen. Furthermore, the critical velocity is not altered by these variables. Drawings of specimens and tables and graphs of data are included.

PB 19833. WYMAN, L. L. and BASCH, D. Centrifugal and precision casting of non-ferrous alloys: Methods of precision casting of metals. Advisory report. (OSRD Rept 1844; War Metallurgy Committee Rept M-123) Sep 1943. 43 p. Price: Microfilm-50¢ - Photostat-$3.00
This report was prepared at the suggestion of the Armed Services and the War Production Board to meet the need for a general and rather elementary review of the field of centrifugal and precision casting of metals. The report is intended for those who, having little or no experience or knowledge in that field, may be considering the production of such castings. Sections of the report are devoted to the following types of castings: Precision, sand, plaster-of-paris, metal-mold and centrifugal. Photographs and drawings are included.

PB 19825. ZICKRICK, LYALL. Bi-metallic copper-steel driving bands for projectiles (MC-159): Part III. Final report, Sep 15, 1944. (OSRD Rept 5115; War Metallurgy Committee Rept M-388) May 1945. 5 p. Price: Microfilm - 50¢ - Photostat - $1.00
This report embodies a record of the work carried on at the Research Laboratories of the General Electric Company for NDRC research project NRC-60 since March 31, 1944. The additional work covered relates only to the production of bi-metallic bands for the 3 inch navy shell and the 37 mm army shell. Inasmuch as the results obtained with bands manufactured for the 40 mm navy shell proved satisfactory, it was decided to manufacture similar bi-metallic test bands for the two above mentioned sizes. The process used in their production was exactly the same as that used previously, and which has already been described in detail (OSRD Rept 3685, PB 19829).

ORDNANCE AND ACCESSORIES

German

PB 22314. BARTHOLOMEW, H. L., JR. and others. Examination of enemy materiel: Metallurgical investigation of German 50 mm gun tubes. Progress report 104, Jan 1, 1945. (OSRD Rept 4695) Feb 1945. 53 p. Price: Microfilm-$1.00 - Photostat-$4.00
This report records the results of examination of the tubes, locking collars, and breech rings of two German 50 mm guns, with the breech block and muzzle brake of gun R:4252, which was conducted to determine the method of manufacture, chemical analysis, and the mechanical and metallurgical properties. The following data are presented in tabular form: Chemical composition of gun tube, breech ring locking collar, breech ring, breech lock, and muzzle brake; hardness surveys; tensile properties; and V-notch Charpy impact tests. Detailed drawings, graphs, and photographs illustrate the text.

PB 22322. BARTHOLOMEW, H. L., JR. and others. Examination of enemy materiel: Metallurgical investigation of German 75 mm gun tubes. Progress report 105, Feb 28, 1945. (OSRD Rept 4913) Apr 1945. 46 p. Price: Microfilm-50¢ - Photostat-$4.00
An examination of two 75 mm German guns of recent manufacture, including tubes; locking collars, breech rings, and the muzzle brake of one was conducted at Massachusetts Institute of Technology to determine the metallurgical and mechanical properties, chemical analysis, and method of manufacture. Mechanical properties of all parts are satisfactory. On comparison of strength vs. ductility, however, the strength values are considerably below those of American guns of similar size. All components examined were forgings. Photographs, graphs, drawings and tables of data are included.

PB 22614. GRENELL, L. H. and others. Examination of enemy materiel: Metallurgical examination of a German Pz.B. antitank rifle of 1941. Progress report 33, Dec 23, 1943. (OSRD Rept 3183. War Metallurgy Committee Rept M-206). Jan 1943. 23 p. Price: Microfilm-50¢ - Photostat-$2.00
This report covers the examination at Battelle Memorial Institute of each part of this German antitank rifle for details of fabrication, treatment, type of material and workmanship. It was found that all but one of the metal parts were made from plain carbon steel. The firing pin guide was of 3-1/2% Ni, 3/4% Cr carburizing steel. A few parts were molded from plastics. The barrel was machined, after forging, from heat-treated carbon steel. The use of numerous stampings was the most interesting structural feature. This indicates that the Germans were beginning to utilize simplified methods of forming which are essential in mass production. Discussion of the findings, economic considerations involved in manufacture, photographs, and tabulated data are included.

PB 22308. GRENELL, L. H. and others. Examination of enemy materiel: Metallurgical examination of a German 7.92 mm MG-17 aircraft machine gun. Progress report 143, Nov 18, 1944. (OSRD Rept 4507) Dec 1944. 21 p. Price: Microfilm-50¢ - Photostat-$2.00
The report records results of the metallurgical examination at Battelle Memorial Institute of a German 7.92 mm MG-17 aircraft machine gun. It was found that steel was used in 146 parts of the gun, copper or copper alloys in 9, aluminum or aluminum alloys in 8, cast iron in 4, lead in 2, and a magnesium alloy synthetic rubber, and a plastic in 1 each. Of the steel parts, 19 were manufactured from alloy steels which, except for the breech, were all in the heat-treated condition. Classification of the steel parts on the basis of type of heat treatment revealed that 33% were annealed; 30% quenched and tempered; 17% carburized, quenched and tempered; 14% cold drawn; 5% normalized; and 1% differentially hardened. The heat treatments were good, and only one part (locking spring 146) was decarburized. Several of the minor parts were fabricated from high sulfur screw stock. The

cast iron used in a few parts contained relatively fine graphite flakes with uniform distribution. The nonferrous parts were manufactured from Muntz metal, tin and aluminum bronzes, and copper; from aluminum, Alcoa 175 and 245, Mn-Mg-Al, and Si-Al type alloys; from lead; and from Dowmetal M(Al-Zn-Mg alloy). Most of the aluminum alloys and the magnesium alloys were solution-treated and aged. Tabulation of the methods of manufacture of the metal parts indicated that 56 per cent were machined, 16 per cent cut from wire and sheet, 12 per cent coiled wire, 7 per cent stamped, 5 per cent cast, and 4 per cent forged. A few minor parts were assembled by soft soldering. The anticorrosion measures taken to protect the parts were paint coatings, black gunmetal-type finishes resulting from immersion in alkali-salt type baths, anodizing of aluminum alloys, chemical treatment of the magnesium alloy, and cadmium plating. Photographs illustrate the report.

PB 22325. GRENELL, L. H. and others. Examination of enemy materiel: Metallurgical examination of German tank track links and pins. Progress report 163, Feb 26, 1945. (OSRD Rept 4916) Apr 1945. 9 p. Price: Microfilm-50¢ - Photostat-$1.00
Examination revealed that two different steel alloys were used for the track links. The Mark III and VI treads were made from austenitic manganese steel (Hadfield steel) containing 11% manganese. The Mark IV and V treads were low-alloy carbon steel, hardened by heat treatment. All treads were cast and, except for differences in size, they were of similar design. Casting technique and heat treatment were of good quality. The connecting pins were forged from mild carbon steel and carburized. Included in this report prepared at Battelle Memorial Institute are discussions of economic considerations in manufacturing and results of the examination, photographs, microphotographs, and tabulated data.

PB 22311. GRENELL, L. H. and others. Examination of enemy materiel: Metallurgical examination of two welded aluminum sections from a German mine. Progress report 149, Dec 12, 1944. (OSRD Rept 4549) Jan 1945. 6 p. Price: Microfilm-50¢ - Photostat-$1.00
This report prepared at Battelle Memorial Institute records the examination of two welded sections of a German type "C" mine. The sections were fabricated from a wrought, 1.3% manganese 2% magnesium, aluminum alloy. This alloy has no American equivalent but is somewhat similar to Alcoa 48 but has a higher strength and probably a corrosion resistance almost equal to Alcoa 2S. The sections were welded with a rod, or rod and flux, that gave a weld bead of a similar alloy but lower magnesium content, 1.6% mg. The welding technique was good. The metal was protected with an oxide film about 0.001 inch in thickness. The film was either applied electrolytically or by an acid dip prior to welding. Both sides of the sections and the weld bead were completely covered with a black phenolic varnish applied over the oxide film. Photomicrographs and a hardness diagram illustrate the report.

PB 22394. GRENELL, L. H. and others. Examination of enemy materiel (OD-113; AC-77; M-119): Metallurgical examination of a German 75 mm. Kw. K 42, AP-HE-C & BC projectile and cartridge case. Progress report 175, Apr 14, 1945. (OSRD Rept 5136. War Metallurgy Committee Rept M-535). May 1945. 13 p. Price: Microfilm-50¢ - Photostat-$1.00
The results of a metallurgical examination at Battelle Memorial Institute of a German armor-piercing shell and long steel cartridge case are presented in this report. It was found that the projectile was fabricated by butt-welding a high carbon chromium-vanadium steel nose to a medium carbon nickel-chromium steel base and uniformly heating and differentially oil quenching the assembly. A flame-hardened cap was soldered to the nose with a lead-tin-antimony alloy. The rotating bands were manufactured from powdered iron. The cartridge case was cold drawn from low-carbon steel and brass plated. Changes from earlier German projectiles examined were made in the heat treatment, but not in the materials or the construction of the shell. Discussion of economic considerations, photographs, drawings, microphotographs, a list of references and tabulated data are included.

Japanese

PB 22264. ABBOTT, H. L. Japanese ordnance equipment: Japanese periscopic sight. (U. S. Army Tech Intelligence Center, Tokyo, Rept 107) Dec 1945. 8 p. Price: Microfilm-50¢ - Photostat-$1.00
This report contains descriptions and photographs of the following: I. Japanese periscopic sight with mount for type 93, 13.2 mm machine gun; II. Japanese periscopic sight with mount for type 92, 7.7 mm heavy machine gun; III. Japanese elevation periscopic sight 4° x 8°; IV. Japanese periscopic sight type 1 model A, two power, for type 4 tank.

PB 17534. ABBOTT, H. L. Japanese type 4 AA director for 15cm AA gun. (Japanese ordnance equipment). (Ordnance Tech Intelligence Rept 131) Jan 1946. 2 p. Price: Microfilm-50¢ - Photostat-$1.00
The Japanese Type 4 AA Director was redesignated from the Type 2 model 4. Information from the Japanese indicates that only one or two pilot and test models had been completed and these were later destroyed in Sept 1945. The director is a linear speed computing device, and consists of the Computer and observation apparatus (Tracker) which is connected by a cable through the Switch Board where cables from the Height Finder, 10 cm AA Spotting Binoculars, Height Finder for Spotting, Battery Commanders Post, and Brigade Commanders Post, terminate. This director is inferior to United States directors and is not of sufficient intelligence value for extensive study.

PB 22328. GRENELL, L. H. and others. Examination of enemy materiel: Metallurgical examination of a Japanese model 89 7.7 mm aircraft machine gun. Progress report 161, Mar 16, 1945. (OSRD Rept 5005) Apr 1945. 15 p. Price: Microfilm-50¢ - Photostat-$1.00
The model 89 aircraft machine gun was fabricated by conventional methods. The use of high-alloy steels for parts subject to wear is typical of Japanese materiel. Flame hardening of contact surfaces was noted throughout the gun. Most of the parts were forged or machined with little use being made of stampings. Many of the individual pieces of the gun showed evidence of being hand finished by filing or grinding. Top and side views and disassembly illustrations of the machine gun are shown. The weights, heat treatments, hardness readings, and methods of manufacture, and chemical and spectographic analyses are tabulated. Photographs of the markings found on the receiver and their translation, and of a typical example of flame hardened wearing surface are shown. This investigation was carried out at Battelle Memorial Institute.

PB 22321. GRENELL, L. H. and others. Examination of enemy materiel: Metallurgical examination of a Japanese model 92 machine gun. Progress report 152, Jan 12, 1945. (OSRD Rept 4827) Mar 1945. 17 p. Price: Microfilm-50¢ - Photostat-$2.00
This report covers the examination of a Japanese model 92 machine gun, the various parts of which were made by conventional methods. For the most part low or medium carbon steel was used. Parts showing differential hardening were the recoil rack and pinion which were flame hardened. Seven parts showed use of alloy steel. The majority of the parts were forged or machined from bar stock. No major parts were stamped from sheet. Tables of data and photographs are included. This investigation was carried out at Battelle Memorial Institute.

PB 22309. GRENELL, L. H. and others. Examination of enemy materiel: Metallurgical examination of an H. E. 15 cm Japanese naval projectile. Progress report 145, Nov 30, 1944. (OSRD Rept 4548) Jan 1945. 8 p. Price: Microfilm-50¢ - Photostat-$1.00
This report, prepared at Battelle Memorial Institute, records results of the examination of an inert, high-explosive 15 cm Japanese naval projectile. The projectile and base plug were manufactured from SAE 1035 and 1030 steels, respectively. The phosphorous content was a little over the maximum

SAE specification of 0.05%. Fabrication of both the projectile and base plug was accomplished by forging, followed by a machining operation inside and outside. The physical properties of the steels were low and suggested no heat treatment after forging. The projectile and base plug were painted inside and outside for corrosion protection. Photographs and micrographs illustrate the text. Average physical properties and chemical and spectographic analysis of the projectile appear in tabular form.

PB 22312. GRENELL, L. H. and others. Examination of enemy materiel: Metallurgical examination of a type 91, change 3, 18-inch, Japanese torpedo. Progress report 146, Dec 8, 1944. (OSRD Rept 4593) Jan 1945. 64 p. Price: Microfilm-$1.00 - Photostat-$5.00

This report describes a Japanese 18-inch torpedo body, torpedo engine, gyroscope, depth mechanism, and pressure vessels. The torpedo was constructed with careful workmanship throughout. A variety of alloy steels was used, including a valve steel, a welded 18-8 stainless steel, and a low-carbon high-chromium steel. Each of these would be subjected to approximately the same temperatures. The welded 18-8 alloy was not stabilized and, consequently, showed heavy carbide precipitation at the welds. Among the remaining alloy steels were some medium and high carbon Ni-Cr-Mo-Cu alloys. The nonferrous alloys were chiefly limited to aluminum and manganese bronze for forgings and bar stock, and tin and silicon bronzes for castings. A majority of parts, such as the frames and housings, were cast from tin-bronze alloys. An uncommon copper-zinc-silicon casting alloy was used to make the water and oil reservoirs. The heat treatment of steel parts was uniform indicating good practice. Aluminum bronzes were precipitation hardened, and the manganese bronzes were probably stress relieved. The tin and silicon-bronze castings were not heat-treated. Several of the parts with special strength requirements were forged; however, most of the torpedo parts were cast or machined from bar stock. The torpedo engine was an eight cylinder, twin-bank, radial, external combustion engine which operated on steam and the products of combustion of gasoline and high pressure air. The torpedo gyroscope was constructed of four types of copper alloys and four types of steel. The depth mechanism consisting of a pendulum, diaphragm and spring showed no unusual alloys. The pressure vessels were the following types: Air flask; fuel tank; lubricating oil tank; and water tank. There are photographs of all the various items and parts described in the report and tables of data concerning the manufacture of parts. This report was prepared by Battelle Memorial Institute and Mellon Institute of Industrial Research.

PB 22327. GRENELL, L. H. and others. Examination of enemy materiel: Metallurgical examination of Japanese 30 mm H. E. incendiary and H. E. tracer ammunition. Progress report 164, Mar 14, 1945. (OSRD Rept 4917) Apr 1945. 7 p. Price: Microfilm-50¢ - Photostat-$1.00

An examination of two half-sections of the above incendiary shells showed that the high explosive projectile was machined from steel similar to SAE 1040. A free machining similar to SAE X1335 was used in the H. E. projectile with tracer. Each steel appeared to be a silicon-killed basic open-hearth product. Each cartridge case was deepdrawn from 70 - 30 brass and mouth annealed. The rotating bands were formed from seamless tubing made from electrolytic copper. The projectiles were covered with single coats of nitrocellulose lacquer. No attempt to conserve copper or copper alloys by substituting less critical materials was noted in these shells. Discussions of economic considerations and of results, photographs, and tabulated data are included in this report prepared at Battelle Memorial Institute.

PB 22315. GRENELL, L. H. and others. Examination of enemy materiel: Metallurgical examination of Japanese 37 mm A. P., H. E. ammunition. Progress report 147, Jan 8, 1945. (OSRD Rept 4696) Feb 1945. 17 p. Price: Microfilm-50¢ - Photostat-$2.00

This report is concerned with an examination that was made of six complete rounds of Japanese 37 mm armor-piercing, high explosive ammunition and three additional projectiles of the same calibre which were manufactured at Osaka, Tokyo, and Nagoya during the ferrous parts of the ammunition were all plain carbon steels, and most of these were manufactured by machining bar stock. The projectiles were manufactured, by slight forging and hot piercing. Ferrous parts were protected by a black paint. Light corrosion was noted on the projectile wherever the adherence of the paint was poor. Non-ferrous parts used were brass and copper. Machining was used extensively; some stamping of sheet copper was found. A clear phenolic lacquer was applied to the non-ferrous parts to afford some corrosion resistance and to prevent a possible reaction between the metal and the explosive charge. Light corrosion was visible on the cartridge case. Chemical tests of the corrosion product disclosed the presence of chloride salts, indicating sea water corrosion. Photographs of the ammunition as received and cross sectioned views are given. Hardness distribution is shown in diagrams.

See also OSRD 4563

PB 22310. GRENELL, L. H. and others. Examination of enemy materiel: Metallurgical examination of Japanese 75 mm A.A. ammunition. Progress report 144, Nov 24, 1944. (OSRD Rept 4583) Jan 1945. 20 p. Price: Microfilm-50¢ - Photostat-$2.00

The Japanese 75 mm anti-anticraft ammunition studied in this report was manufactured from November 1939 to March 1943 but no change was noted in the manufacturing method or in the materials used in this ammunition during this period. The analysis of each of the steel shells was surprisingly consistent and indicated that plain carbon steel had been used. The alloy residuals were low, except for copper and tin. Carefully selected scrap had evidently been used for a large part of the charge in making the steel. Paint and lacquer were used on all parts, except the rotating bands, to obtain resistance to corrosion. Lacquering of brass cartridge cases appears to be a common Japanese practice. Photographs and diagrams illustrate the text. Test data are given in tabular form. This report was prepared at Battelle Memorial Institute.

PB 22611. HENDERSON, A. S. and others. Examination of enemy materiel (CD-113): Corrosion protection of Japanese ordnance. Progress report 32, Dec 27, 1943. (OSRD Rept 3165. War Metallurgy Committee Rept M-204). Jan 1944. 13 p. Price: Microfilm-50¢ - Photostat-$1.00

The metal coatings found on Japanese ordnance were of two distinct types. On the rifles, machine guns, and grenade discharger examined, all of the protective coatings were of the oxide type or customary "gun metal" finish. These offered little protection from corrosion. The second type of coatings, used on 20 mm. aircraft guns, was an alkyd-resin coating containing carbon-black pigment applied over a surface prepared by a process similar to the Parkerizing or Bonderizing treatments used in this country. This type of coating is markedly superior to the oxide or gun-metal finish, and showed lasting protection under both salt spray and humidity conditions. The oxide coatings showed negligible corrosion protection and served chiefly as a means of reducing reflection and as a base for maintaining an oil film. The slushing and lubricating oils removed from the rifles, machine guns, and 20 mm. cannon were of three distinct types; one containing sulphur, one containing chlorine, and a third free from either element. Each of the oils contained approximately 10 percent of a spreading agent added to a straight lubricating oil to assist in film formation and as an aid in preventing corrosion. The results of an analysis of oxide film on Japanese ordnance are tabulated. Photographs are included. This investigation was made at the Battelle Memorial Institute.

United States

PB 22033. BERLIN, AARON S. Development of 100-lb. cluster adapter M20 for low altitude bombing. (CWS Tech Div Memo Rept 889) Sep 1944. 24 p. Price: Microfilm-50¢ - Photostat-$2.00

The object of the work described in this report was to develop an adapter for a 100-lb. quick opening cluster of fourteen M74, M69, or M77 incendiary and chemical bombs; the cluster to be suitable for suspension by either single or double

lugs, the adapter to be opened when approximately 25 ft. below the airplane and to be entirely free of bombs when approximately 50 ft. beneath the airplane. The cluster adapter M20 meets all Army and Navy requirements for proper mechanical functioning. The report presents historical, theoretical, and experimental information, followed by discussion, conclusions, and recommendations. The appendix is made up of photographs.

PB 22113. BRAUE, W. F. and others. Retardation of fragments. (Aberdeen Proving Ground Ballistic Res Lab Rept 426) Nov 1943. 55 p. Price: Microfilm-$1.00-Photostat-$4.00
In order to solve terminal ballistic properties such as the minimum safe altitude in skip bombing and the effective burst radius of anti-aircraft fire it is necessary to know the ballistic properties of the fragments. To learn this real fragments recovered from shells were fired in a ballistic range in order to measure the retardation force. Each fragment was photographed and timed several places along its trajectory. The retardation was computed from the experimental measures of time and distance. The first part of this report gives experimental techniques and details. The second part gives the results thus obtained in the form of graphs of drag coefficients based on various representative areas plotted against Mach's number. Tables of data, spark photographs of fragments and photographs of apparatus are included.

PB 18858. BRINKLEY, STUART R., JR. and WILSON, E. BRIGHT, JR. Calculation of the detonation velocities of some pure explosives: Progress report. (OSRD Rept 1707) Aug 1943. 51 p. Price: Microfilm-$1.00 - Photostat-$4.00
This report presents a summary of the theory used in the hydrodynamic-thermodynamic treatment of detonation waves in solid explosives. In addition to the detonation velocity, the theory calculates the density, pressure, mass velocity, temperature, and composition of the region immediately behind the wave front. For the purposes of the theory, the explosive is described by its gross initial density, and by its heat of formation and the number of gram atoms of each atomic kind per gram mol of explosive. The theory is applied to the calculation of the detonation velocity and related quantities of sixteen explosives, and the results are shown in tables and graphs. This report is related to OSRD reports 69 (PB 19784, p. 1510), 114, 905, and 1219; it was prepared under contract with Harvard University.

PB 22103. BUSHKOVITCH, A. V. Penetration of steel spheres into wood as a function of striking velocity. (Aberdeen Proving Ground Ballistic Res Lab Rept 462) Apr 1944. 16 p. Price: Microfilm-50¢ - Photostat-$2.00
This investigation originated in an attempt to calculate the initial velocities of shrapnel balls originating in experimental shrapnel loaded projectiles from their penetrations into wood in panel tests. However, computations based on existing penetration formulas gave results for the initial velocities which appeared to be much too high. It was thought that the discrepancy might be due to differences in target material, and it was decided to carry out firings of spheres using smooth bore rifles. Steel spheres (ball bearings), 9/32" and 9/16" in diameter, were fired into 1" yellow pine boards, nailed together in a stack. Then, 9/16" steel spheres were fired into a similarly constructed plywood target consisting of 1" plywood boards. Empirical formulas giving the dependence of penetration on striking velocity are given. Tables give the penetration of steel spheres into pine wood and plywood. Curves show comparison of equation with observed penetrations.

PB 22112. CARR, THOMAS D. and others. An improved method for the measurement of blast from bombs. (Aberdeen Proving Ground Ballistic Res Lab Rept 336) Apr 1943. 14 p. Price: Microfilm-50¢ - Photostat-$1.00
This report describes a method for measuring the blast from bombs in which the pressure calibration of the blast gages is determined simultaneously with the blast from the velocity of the shock wave. The method can be used with Rochelle salt gages which give a high signal level. Tests have been conducted with 100-pound demolition bombs, and the method was found to have a high precision. Results of tests are shown in tabular form. Drawing of field set-up of gage used and chart recording the explosion of a 10-pound Amatol bomb are included.

PB 22792. COMBRITZ, GEORGE. Temperatures in a hollow cylinder. Oct 1945. 18 p. Price: Microfilm-50¢ - Photostat-$2.00
This report is concerned with formulas for temperatures in a solid bounded by two coaxial circular cylindrical surfaces, when heat is supplied to the solid through the inner surface. These formulas are in practical application in connection with the heating of the barrel of a gun firing continuously. It is likely that they will find other applications. The formulas have to do with four problems. In three problems the solid extends infinitely both ways in the axial direction, the rate of entry of heat at a given moment is the same all over the inner surface, the thermal coefficients are constant, and the initial temperature of the solid is zero. In the fourth problem the solid need not extend infinitely, the rate of entry of heat at a given moment can vary with distance along the axis, although it must be constant along any circle cut on the inner surface by a plane perpendicular to the axis and the thermal coefficients and initial temperature may vary with r, s, and t. Certain corrections appear in the memorandum appended to this report.

PB 22109. DEBEY, L. G. and ZUG, R. S. History of the ballistic camera and range bombing instrumentation. (Aberdeen Proving Ground Ballistic Res Lab Rept 577) Sep 1945. 74 p. Price: Microfilm-$1.00 - Photostat-$5.00
This report discusses the development of the ballistic camera from its first conception in 1941 up to the date of this report, 1945. It gives a brief history and record of the early development program and a description of the general method of the operation of the system. With the advent of bombers capable of considerably greater elevation and speed than those known before the war, it became imperative to develop an instrumentation capable of measuring their position and velocity at the instant of bomb release. Photographs and block diagrams illustrate the text.

PB 22110. DEDRICK L. S. and KENO, F. Y. Solution of differential equations of motion of a projectile with Newtonian resistance in an atmosphere of variable density. (Aberdeen Proving Ground Ballistic Res Lab Rept 343) Mar 1942. 21 p. Price: Microfilm-50¢ - Photostat-$2.00
A reduction to quadratures is made for the solution of the equation of motion of a projectile in vertical fall with Newtonian resistance in an atmosphere with density proportional to an exponential function of the altitude. Two procedures involving quadratures over short arcs are given for the projectile with general initial horizontal velocity. Since general use of the Newtonian resistance is made abroad, it is considered that these results may have applications in comparative studies of American and foreign ballistic measurements.

PB 22028. ELTON, ROBERT W. Grenade, hand, smoke (WP) M15. (CWS Tech Div Memo Rept 960) Jan 1944. 11 p. Price: Microfilm-50¢ - Photostat-$1.00
The object was to determine if the brazed joints of the above named grenade could be reinforced against possible leakage, by the application of a protective coating on the inside of the grenade. The tests disclosed that due to the action of the white phosphorus on the coating, lining the inside with Barretts water works enamel, either completely or partially did not provide any effective protection. Desert and arctic surveillance tests were made. Historical, theoretical, and experimental data are given followed by discussion, conclusions, and recommendations. A photograph appears in the appendix.

PB 22111. FAWCETT, C. C. The Brandes progressive die method for producing cartridge cases: First and final report. (Frankford Arsenal Ordnance Lab Rept 85) Sep 1941. 15 p. Price: Microfilm-50¢ - Photostat-$1.00
The object of this investigation is to determine whether or not the method of producing cartridge cases proposed by Mr. Brandes is mechanically and economically feasible. It is shown in this report that according to the Frankford Arsenal cost estimate of the proposed Brandes' progressive die method it is somewhat higher on the caliber .30 cartridge case than the present method of manufacture. However, on the caliber .30 ball M2 bullet jacket, the caliber .45 cartridge case and the caliber .45 bullet jacket M 1911 the estimated Brandes' method costs are slightly less than the actual costs of the present method. It is also shown that this method has never produced a cartridge case automatically, that a die of this intricacy has never been built and that the proposed machine has had only a very short production test. A very material saving in initial cost of equipment and manufacturing space could be effected by the Brandes' process. The report concludes that if Brandes' process can be proven to function satisfactorily, it will be worthy of consideration from the standpoint of the development of new sources of manufacture.

PB 22116. KELLEY, J. L. and MCSHANE, E. J. On the motion of a projectile with small or slowly changing yaw. (Aberdeen Proving Ground Ballistic Res Lab Rept 446) Jan 1944; Rev Dec 1944. 36 p. Price: Microfilm-50¢ - Photostat-$3.00
The present treatment of the motion of a projectile differs from previous treatments in that no assumption on magnitude of spin is made, so that the results are valid for bombs or other fin-established projectiles. New stability conditions are found, and it is believed that the treatment is more complete and precise than previous work. Equations of motion are followed by solutions of the equations of motion. Stability conditions are discussed and equations are formulated. There are also equations for the particular interval, drift. The appendix contains the notation for the following: Physical constants; coordinates and velocities; aerodynamic coefficients; forces and moments; and other factors. The appendix also contains a bibliography.

PB 22097. KENT, R. H. The smokiness of "smokeless" powder. (Aberdeen Proving Ground Ballistic Res Lab Rept 33) Feb 1936. 9 p. Price: Microfilm-50¢ - Photostat-$1.00
This report attempts to answer the question as to what conditions of firing and what constitution of powder tend to produce smoke. By means of the theory outlined in the report smoke formation pressure has been calculated as a function of the temperature for a cordite powder, a ballistic powder, a pyro powder, and an FNH powder. The compositions of the powders are given in tabular form. The smoke formation pressure for each powder as a function of the temperature and also the value of the equilibrium constant for a given temperature are calculated. Smoke formation versus temperature for various powders is shown in curves.

PB 22094. LANE, J. H. Temperature of an aircraft machine gun barrel when fired at a rate of 122 rds/min. (Aberdeen Proving Ground Ballistic Res Lab Rept 23) Nov 1935. 6 p. Price: Microfilm-50¢ - Photostat-$1.00
The object of this study is to calculate approximately the temperature reached in the subject gun by firing for 600 rounds at a rate of 1200 rds/min. in an attempt to explain the rapid erosion of the barrels. The method used for calculating the temperature difference between the inside and outside of the barrel is developed in detail in the appendix attached to this report. It is concluded that, neglecting the cooling and the difference in temperature between surface and interface and assuming the heat input per unit length to be the same for the aircraft gun as for the tank type, the temperature rise will be about 2° C. per round and the temperature of the barrel would therefore be about 1200° C. after 600 rounds.

PB 22276. LOEW, THEODORE. Practice anti-tank size fuse lighter. (CWS Tech Div Memo Rept 308) 1941. 9 p. Price: Microfilm-50¢ - Photostat-$1.00
The object of the work covered by this report was to develop a fuse lighter to ignite Bickford safety fuse on contact with FM or FS. FM was not sufficiently reactive to ignite materials which would not be too sensitive to shock or friction to permit safe handling. The modified matchhead mix in a fuse union provides a fuse igniter to be started by contact with FS. Only a small amount of FS is required for ignition but flooding or immersion of the lighter will not extinguish it; therefore, the chance of ignition failure is slight. A directive for the manufacture and use of FS fuse lighter is appended with drawings.

PB 22114. MAYER, JOSEPH E. Probability of two close hits on a target. (Aberdeen Proving Ground Ballistic Res Lab Rept 429) Nov 1943. 12 p. Price: Microfilm-50¢ - Photostat-$1.00
In firing at concrete structures, such as the vertical face of a pill box, it is sometimes necessary to obtain two hits within a very small distance, r, of each other, in order to penetrate the structure. The problem then arises as to what probability one has of making such a paired hit, or, more succinctly, how many rounds must be fired at a given target in order to obtain the necessary two hits close together. In this report an expression for the probability of obtaining two hits in two rounds within a short distance of each other on the vertical face of a target is derived. The number of rounds required for a probability of 0.9 of obtaining at least two hits within 0.5 yards of each other on various size targets for various ranges of the 155 mm gun M1, firing H.E. shell M101, and the 8-inch Howitzer M1, firing H.E. shell M106, are tabulated.

PB 22115. HERO, F. V. On the motion of shell with eccentric center of mass when rolled on parallel bars. (Aberdeen Proving Ground Ballistic Res Lab Rept 393) Aug 1943. 21 p. Price: Microfilm-50¢ - Photostat-$2.00
The current technique for determining the degree of static unbalance, or eccentricity of the center of mass of shell, consists in rolling them on parallel bars, observing the starting angle and period and applying a formula which does not take account of the effect of rolling friction. It has been pointed out that the effects of rolling friction would be accounted for, and the procedure for doing this has been given in this report. However, the method of this report is dependent on the current experimental technique which fails unless the shell is very eccentric and is started in a definite angle zone which may be narrow. The method is liable to inaccuracies and experimental complications as it requires that observations be made while the shell is in motion. It is therefore recommended that a new procedure recently suggested be employed. Diagrams illustrate the report. The appendix contains a table of Legendrian elliptic integral of the first kind taken from Precis elementaire de la theorie des fonctions elliptiques. A table of friction-time integrals is also given in the appendix.

PB 22777. U. S. PICATINNY ARSENAL, DOVER, N. J. Description of manufacture: Bomb, frag., 4 lb., M83 (in wafers). Sep 1944. 59 p. Price: Microfilm-$1.00 - Photostat-$4.00
This manual describes the method of loading, assembling, and packing the 4 pound fragmentation bomb in use at the Wolf Creek Ordnance Plant as of May 1944. Photographs illustrate the various steps of the process. Machines, tools, gages, etc. actually used are listed on pertinent operation sheets. Tool and equipment drawings available are listed.

PB 22775. U. S. PICATINNY ARSENAL, DOVER, N. J. Description of manufacture: Bomb, G.P. 250 lb., AN-M57A1 (straight TNT loaded). Apr 1945. 53 p. Price: Microfilm-$1.00 - Photostat-$4.00
This report describes a method employed as of Feb 1945 at the Louisiana Ordnance Plant of loading and assembling of the bomb, G.P., 250 lb., AN-M57A1 (straight TNT loaded). Photographs showing each step, with explanatory notes, are used. Machines, tools, gages, equipment, etc. used are listed on pertinent operation sheets.

PB 22776. U. S. PICATINNY ARSENAL, DOVER, N. J. Description of manufacture: Bomb, S.A.P., 1000 lb., AN-M59A1 (straight TNT loaded). Feb 1944. 71 p. Price: Microfilm-$1.00 - Photostat-$5.00
The manual describes a method of loading and assembling the 1000 pound semi-armor piercing bomb as used at Louisiana Ordnance Plant as of January 1944. Photographs illustrate the various steps of the process described. Machines, tools, gages, etc. actually used are listed on pertinent operation sheets.

PB 22780. U. S. PICATINNY ARSENAL, DOVER, N. J. Description of manufacture: Detonator, M18. Apr 1944. 76 p. Price: Microfilm-$1.00 - Photostat-$6.00
This manual describes the method of assembling, loading, and packing the M18 detonator used at the Arkansas Ordnance Plant as of January 1944. Photographs illustrate every step of the process as described. Machines, tools, gages, etc., which are used, are listed on pertinent operation sheets. Available tool and equipment drawings are listed.

PB 22779. U. S. PICATINNY ARSENAL, DOVER, N. J. Description of manufacture: Mine, A.T., heavy, M6. Apr 1945. 84 p. Price: Microfilm-$1.00 - Photostat-$6.00
This manual describes the method of loading, assembling, and packing the anti-tank mine by methods used at the Louisiana Ordnance Plant as of February 1945. Photographs illustrate each step of the process. Machines, tools, gages, etc., which are used, are listed on pertinent operation sheets.

PB 22778. U. S. PICATINNY ARSENAL, DOVER, N. J. Description of manufacture: Shell, H.E. 155 mm. M107. Jul 1944. 55 p. Price: Microfilm-$1.00 - Photostat-$4.00
This manual describes the method of loading and assembling a high explosive shell according to the methods used at the Iowa Ordnance Plant as of April 1944. Photographs illustrate each step of the procedure. Machines, tools, gages, etc., which are used, are listed on pertinent operation sheets.

PB 20604. WILLIAMS, C. M. The development of a lachrymatory grenade. (Edgewood Arsenal Chemical Div Rept 66). Jul 1921. 26 p. Price: Microfilm-50¢ - Photostat-$2.00
This report covers the development of a lachrymatory grenade suitable for training purposes or for police use in breaking up riotous mobs. Tables and diagrams are given.

PB 22365. WOODBERRY, DAVID L. Engineering tests of 4.2-in. chemical mortar standard M1, modified, with special elevating screw and elevating screw sleeve. (CWS Tech Div Memo Rept 283) Apr 1941. 22 p. Price: Microfilm-50¢ - Photostat-$2.00
Tests were made of the 4.2-in. chemical mortar standard M1 (modified), with a special elevating screw provided with special Acme form threads of shallow depth, and an accompanying special elevating screw sleeve, to determine strength and performance during firing. As a result of the tests described it was concluded that the elevating screw with special Acme form threads of shallow depth, and the elevating screw sleeve are satisfactory for the 4.2-in. chemical mortar. The traverse slide and the two rivets which secure the elevating screw to the slide deform upon repeated firing. Steps should be taken to hook the tie rods in the center of the baseplate, and to prevent the turning of the traversing and elevating screws as each shot is fired. Blueprints of each part are included.

PHOTOGRAPHIC AND OPTICAL GOODS (INCLUDING PHOTOGRAPHIC PROCESSING)

PB 22942. DEVLIN, A. J. and KLEETH, E. F. Investigation of processing equipment and materials used by the German firms in the manufacture of lenses and prisms for military optical instruments. (Naval Tech Mission in Europe Tech Rept 455-45) Oct 1945. 17 p. Price: Microfilm-50¢ - Photostat-$2.00
The following four optical instrument manufacturing firms were visited: Ernest Leitz Co., Wetzlar; M. Hensoldt Söhne, Wetzlar; O. Rodenstock, Munich; and Steinheil Söhne, Munich. Ernest Leitz Co. is at present engaged in the manufacture of the miniature type "Leica" camera, and in the repair of American made binoculars for the U. S. Army. Sections of the plant inspected and described in this report are: Glass cutting, prism grinding, blocking prisms for polishing operation, polishing of prism blocks, lens grinding and polishing, lens cementing, coating of lenses with low reflecting films, metallic reflecting films, production of reticules and scales. Methods varying from American practices are indicated. Preparation of sodium silicate solution for coating of lenses with low reflecting films is described. M. Hensoldt Söhne were engaged on a small order of binoculars (König erecting prism type) for the U. S. Army. The few people employed at O. Rodenstock, Optische Werke, were engaged on spectacle lens production. During the war this firm was engaged on the production of 6x30 binoculars (Porro prism type) and panoramic field gun sights. Steinheil Söhne is at present producing some small orders of aerial camera lenses for the U. S. Army and a small quantity of spectrographs. A large block of yellow ray filter glass which appeared to be of very good optical quality was observed at this plant. It is believed that production of ray filter glass in block form has many advantages that could facilitate the production of finished ray filters. This firm has also developed an improved type of evaporating unit particularly for the coating of reflecting films. Heated windows for use in aircraft instruments in which tungsten filament is contained within the glass itself were manufactured. The method is described herein.

PB 22829. GERRETSON, F. W. Agfa paper formulae. (Naval Tech Mission In Europe Tech Rept 140-45) Jul 1945. 87 p. Price: Microfilm - $1.00 - Photostat - $6.00
The Agfa paper works at Leverkusen, a division of I.G. Farben, manufactured 60% of the photographic paper used by the Wehrmacht. Most of the pre-war lines of papers and surfaces have been eliminated and production centered around those products which would lend themselves best to the needs of both the Wehrmacht and the limited civilian trade they were allowed to maintain. The facilities of the paper works were little damaged by bombing. Glossy paper in both contact and enlarging, and semi-matte in both types were produced in fairly large quantities. Only a certain amount of what are known as pretrait surfaces was produced. Formulas were obtained for all papers manufactured by this company. The following are included: (1) Lupex (contact); (2) Brovira (enlarging); (3) Protriga (slow, warm tone enlarging); (4) Portriga rapid (medium speed warm tone enlarging); (5) Momento; (6) Röntgen (X-ray); (7) Registrier paper; (8) Igestat; (9) Igestat (transparent); (10) Copex; (11) Copex (transparent); (12) Copystat; (13) Igepe (the Brovira emulsion); and (14) Correctostat (Brovira emulsion) In addition to the formulae there are listed the sensitometric curves for the different emulsions and contrasts. This report will not reproduce well. Pages 5-55 of this report are photostatic copies of "Manufacturing recipes for Agfa papers", an appendix in PB 20090, p. 4044.

PB 22937. KNOWLTON, W. R. The production of end reflector mirrors in the German optical industries. (Naval Tech Mission in Europe Tech Rept 418-45) Sept 1945. 8 p. Price: Microfilm-50¢ - Photostat-$1.00
This report covers the production of fused quartz and also the production of end reflector mirrors for range finders from this material. The report covers the equipment and methods of the Heraeus Company of Hanau who seemed to be the leaders in the field. The information was gathered from discussions with Engineer Mohn who is the head of this department in the Company. In the United States end reflector mirrors have been made of a combination of glass and metal. In Germany mirrors were manufactured completely of fused quartz of very good quality. This report describes in detail the process of preparing quartz for fusing handling of quartz ingots prior to final fabrication and end reflector production. By this process the manufacturers were able to get an accurate end reflector that is free from the strains and distortions caused by the difference of coefficient of expansion of more than one material.

PB 22243. KNOWLTON, W. R. The production of partial reflecting mirrors in the German optical industries. (Naval Tech Mission in Europe Tech Rept 464-45) Sep 1945. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
In Germany, the amount of reflection and transmission of partial reflecting mirrors is determined by the material that is used as the reflecting medium. The process for producing iron oxide mirrors and titanium oxide mirrors is given. The finished mirror has very definite properties and one can be sure that every mirror will have the same optical properties. The properties for the iron oxide mirrors are: Reflection, 52%; transmission, 42%; and absorption, 6%. The properties of the titanium oxide mirrors are: Reflection, 42%; transmission, 57%; and absorption, 1%. These values are always the same and can, therefore, be used in any optical calculation. The author states that this is quite an advantage over the American method where the reflection and transmission vary with the control executed by the operator. Information regarding these mirrors was obtained from Dr. Rollwagen, of the Steinheil Company, Munich.

PB 22227. U. S. WAR DEPARTMENT. Camera equipment mounting PH-515/MP. (Tech Manual 11-2360) Nov 1944. 22 p. Price: Microfilm-50¢ - Photostat-$2.00
The mounting equipment discussed in this manual consists of two wooden platforms and a system of belt assemblies designed to mount standard 35-mm motion picture camera equipment on a U. S. Army jeep. The mounting equipment provides two rigid set-ups for a baby tripod and one for a standard tripod. It may also be used as a platform for the camera man to stand on when operating the camera. Operating, maintenance, and repair instructions are given. Photographs and a maintenance parts list are included.

PB 22260. U. S. WAR DEPARTMENT. Camera equipment PH-545/PP (V-mail). (Tech Manual 11-2312) Jun 1945 71 p. Price: Microfilm - $1.00- Photostat - $5.00
This manual provides operating maintenance and repair instructions for the camera equipment, a semiautomatic, portable, document-copying set for recording documents on 35- or 16-mm perforated or unperforated photographic film. The unit operates on 115-volt alternating current or 115-volt direct current when used with a converter. The equipment consists of a camera (Recordak film unit model E), a tripod and easel assembly, reflector flood lamps, a light meter, a foot switch, and a power control unit. The automatic camera is electrically operated and photographs small documents placed horizontally on an easel attached to the tripod base, or larger documents mounted vertically on a wall support. The equipment can be used to copy any type of document, map, or chart which can be accomodated by the 22½ by 33½-inch easel. When using 35-mm unperforated film for horizontal operation, documents up to 37½ by 52½ inches can be recorded. When 16-mm unperforated film is used for vertical operation, the camera can copy any document up to 10½ by 27 inches. Documents up to 17 by 45 inches can be copied when the unit is used horizontally. In Photomail stations, the equipment is used to supplement recorders which record V-mail letters. Recorders cannot be used for maps, charts, official documents and other materials which differ in size from the standard V-mail letter. Kodachrome film can be used in the camera to photograph documents in full color. The portability of the equipment makes it particularly useful in the event that the secret nature of the documents to be copied prohibits their transfer. The entire unit can be set up for operation in 10 or 15 minutes. Photographs and diagrams, a field size reduction table, check lists, and trouble charts are given.

PB 22356. U. S. WAR DEPARTMENT. Cameras, PH-330-A through PH-330-J. (Tech Manual 11-2396) May 1945. 157 p. Price: Microfilm - $2.00 - Photostat - $11.00
This manual describes the cameras of the PH-330 series and provides complete instructions for installation and assembly, operation, maintenance, lubrication, and repair of the equipment. There are nine related models of cameras in the PH-330 series. They are Bell Howell, 35-mm, hand-held, spring-driven, motion picture cameras with a daylight loading capacity of 100 feet. The manual gives detailed consideration to the g model since it is a field model in wide general use. A table enumerates the difference in models and the various items special to given models are discussed. Special emphasis is given to the H model since this particular model is used by the army as particularly adapted to field and combat conditions. Photographs and drawings illustrate the manual. There is a list of maintenance parts and a section devoted to variant parts. The following tables appear in the manual: Hyperfocal distance; depth of field with 35-mm lens; depth of field 50-mm lens; and depth of field 100 mm lens.

PB 22240. U. S. WAR DEPARTMENT. Darkroom PH-392. (Tech Manual 11-2363) Jul 1945. 55 p. Price: Microfilm - $1.00 - Photostat - $4.00
This manual describes a portable, heater-ventilated tent designed to provide limited darkroom facilities with a minimum expenditure of time and effort. The unit may be set up in a few minutes. Instructions are given for erecting the tent, assembling and installing the equipment, operating the heater, maintaining the equipment, and repairing and adjusting the various items. Photographs and diagrams illustrate the text. There are check lists and a trouble chart.

PB 22226. U. S. WAR DEPARTMENT. Developing machine PH-512/MP; V-mail. (Tech Manual 11-2305) Feb 1945. 35 p. Price: Microfilm - 50¢ - Photostat - $3.00
This manual describes a developing machine which was designed for processing 16-mm film lengths up to 100 feet. The machine consists primarily of two corrosion resisting steel reels on which the film is wound. The manual gives instructions for installation, assembly, operation, maintenance, and repair. Photographs, diagrams, and curves are included. Eastman formulas D-11 and F-5, recommended for processing this film and a maintenance list for developing machine are given.

PB 22242. U. S. WAR DEPARTMENT. Dryer PH-288. (Tech Manual 11-2381) Apr 9, 1945. 20 p. Price: Microfilm - 50¢ - Photostat - $2.00
The manual describes the dryer, discusses the auxiliary equipment such as wringer, photographic blotters and squeegee, and provides instructions for operation, maintenance and repair of the dryer. This dryer is designed for quick drying of glossy and matte photographic prints by the application of heat to ferrotype plates. The heat is controlled by a thermostat. Plates of any size up to 16 by 24 inches may be used but none are supplied as part of this equipment. Photographs and a diagram illustrate the text.

PB 22239. U. S. WAR DEPARTMENT. Enlarger PH-285, V-mail. (Tech Manual 11-2307) Jun 1945. 77 p. Price: Microfilm - $1.00 - Photostat - $6.00
This manual describes and provides instructions for operating, maintaining and repairing the subject equipment. This enlarger is designed to enlarge negative images from a continuously moving, 100-foot roll of 16-mm film which is synchronized with and focused on a moving roll of photosensitive paper 4½ inches wide. The enlarging factor is set at 8 diameters so that the machine, which accomodates one roll of paper 825 feet long, can project a 100-foot roll of film on a single roll of paper in one continuous operation. The equipment which is manufactured by the Eastman Kodak Company is commonly known among V-mail personnel as the Airgraph model III continuous enlarger. The enlarger is equipped with a fixed focus, 50-mm lens with diaphragm openings from f/4.5 to f/22. It operates on 110- to 120-volts, 50- to 60-cycle, alternating equipment. Because of the continuous motion it is impractical to use this enlarger with rolls of negatives that vary greatly in background density of individual images. One section of the manual is devoted to establishing methods of print control. The trouble shooting charts include remedies for electrical troubles, mechanical troubles, and photographic troubles. Minor repairs and adjustments are explained. The manual is illustrated with photographs, wiring and other diagrams, charts, and a maintenance parts list are included.

PB 22262. U. S. WAR DEPARTMENT. Projector equipments PH-132 and PH-132-B. (Tech Manual 11-2349) Apr 1945. 56 p. Price: Microfilm - $1.00 - Photostat - $4.00
The two projectors described in this manual are intended for the projection of still pictures for educational purposes in an average size classroom. The PH-132 is a Bausch and Lomb item; the PH-132-B is manufactured by Raystone. Both projectors are equipped to handle 35-mm film strips, standard size slides and opaque objects, such as pages of books or postal cards. Instructions are given for installing all parts of the equipment for the various types of operation. An equipment performance check list, preventive maintenance check list, and trouble chart are included. Photographs illustrate the manual.

PB 22217. U. S. WAR DEPARTMENT. Projectors PH-222 and PH-222-A. (Tech Manual 11-408) Oct 1944. 69 p. Price: Microfilm - 50¢ - Photostat - $5.00
This manual covers the description and operation of two projectors which differ slightly in minor details of construction, certain component parts, and methods of operation. These projectors are designed to project still pictures from 35-mm perforated film in single or double frame and from 2" x 2" slides. Both projectors may be operated on a-c or d-c power source.

PB 22030. WEST, A. L. Effect of chemical warfare agents on photographic supplies and equipment. (CWS Tech Div Memo Rept 880). Aug 1944. 17 p. Price: Microfilm-50¢ - Photostat-$2.00
The work was undertaken in order to obtain information as to the probable serviceability of photographic supplies and equipment after exposure to various chemical warfare agent. Photographic film and sensitized printing paper are not affected by direct exposure to high concentrations of well-known chemical warfare agents at ordinary temperatures. Liquid lewisite and bleaching powder-water slurry both cause permanent damage to the emulsion on processed negatives and glossy prints within one hour, although liquid mustard, DANC solution, or the combination of both, have no damaging effect after 24 hours' contact. High vapor concentrations of well known chemical warfare agents with the exception of AC (hydrocyanic acid) in developing solutions have little or no effect on photographic developing, fixing, or washing solutions although vapor-contaminated water may retard development and cause fogging if used for a pre-soaking treatment. Water contaminated with H (mustard gas) or L (Lewisite) may be made suitable for photographic purposes by treatment with activated carbon or by distillation in a commercial water still; boiling or treatment with bleaching powder are unsatisfactory. DANC, M4 is suitable for decontaminating photographic equip----. The report contains historical and experimental data results given in tabular form, discussion of results, lusions and recommendations.

PRINTING, PUBLISHING, AND ALLIED INDUSTRIES

PB 20337. SUPREME COMMANDER FOR THE ALLIED POWERS. CIVIL INFORMATION AND EDUCATION SECTION. RESEARCH AND INFORMATION DIVISION. List of current Japanese magazines, Mar 15, 1946. (Special Rept RI-109-PP-C-1 Mar 1946. 47 p. Price: Microfilm-50¢ - Photostat-$4.00
This list of 720 magazines includes those which are definitely known by the Press and Publications Research Unit of the above mentioned Division to be currently published in Japan. It is estimated that it represents at least 90% of the total circulation of all magazines now reaching the Japanese people, and approximately 80% of the actual titles which are being printed. The list has been classified by subject. Within each catagory the magazines are listed alphabetically under their Romaji titles(with English translation in parentheses), followed by the address and name of the editor. The index gives the subject classification, the number of magazines included in that group and the page on which the listing of each classification starts.

PB 19195. U. S. WAR DEPARTMENT. ARMY SERVICE FORCES. Parchment master reproduction. (Manual M 812) Jan 1946. 28 p. Price: Microfilm-50¢ - Photostat-$2.00
Procedures used in the duplicating of circulars, form letters, memoranda, etc. by a parchment reproducible master process, using 60-pound long grain parchment paper, similiar to that used for wrapping butter. All other material and equipment is that used in regular off-set duplicating. Masters may be made from photographic plates, other masters or by direct image. Instructions for each method and their subsequent reproduction and the care of the machine are given. Advantages of this method over others are presented. Graphs and illustrations.

PB 19181. U. S. WAR DEPARTMENT. ARMY SERVICE FORCES. Reproduction of War Department shipping documents, vendor's shipping documents, (Manual M 406) Jun 1945. 169 p. Price: Microfilm-$2.00 - Photostat-$12.00
This manual describes the four methods of reproducing War Department, Vendor's, and Theater shipping documents in accordance with the procedure prescribed in ASF Manuals M 401, M 410, and War Department Technical Manual 38-413; Carbon copy, hectograph, mimeograph stencil and offset method. The manual is accompanied by copies of manufacturer's instruction books on different types of reproduction equipment: "Standard Fluid Process Duplicators-- Instructions Model SH" and "Standard Fluid Process Duplicators-- Instructions Model EMD";"Speeding the Preparation of War Department Shipping Documents (War Dept., Vendor's, Theatre Documents, and Other Forms of This Type) with Ditto Direct Process Duplicators"; "How to Produce War Department Shipping Documents, Vendor's Shipping Documents, Theater Shipping Documents, on the Mimeograph Duplicator"; "Producing War Department Shipping Document on the Model 1250 Multilith Duplicator." This manual supersedes Army Service Forces Manual M406, Duplicating Methods and Forms; War Department Shipping Document, Sep 25, 1943. In addition to a section devoted to instructions regarding each of the four methods of reproduction, there are sections showing fac-similies of the forms and explaining their use, on training procedure, on envelopes and car cards, on how to order shipping document forms, and on how to order blank paper stock to reproduce shipping documents.

RUBBER AND RUBBER PRODUCTS

PB 23187. FISHER, S. P. Manufacture of hard rubber parts for storage batteries and battery ventilating equipment for German submarines. (CIOS File XXXII-61, Items 1, 12). n.d. 26 p. Price: Microfilm-50¢ - Photostat-$2.00
An examination of batteries on submarines that had been in service was made in order to study causes and types of damage. This report covers primarily the methods of manufacturing rubber parts used in the construction of storage batteries and battery compartment ventilating equipment for German submarines. In doing this, all data on special equipment have been incorporated. In some cases rubber, due to its scarcity, was being or had been recently replaced by other materials and the molding or manufacturing methods used on the substitute articles are also covered. Information on manufacture of rubber parts for torpedo batteries is also included. Also recorded is some interesting development work done on submarine jars of phenol plastic material. Most of the hard and soft rubber parts were made by Accumulatoren Fabrik Aktiengesellschaft.

PB 23152. HUSS, H. O. Gunfire tests of self-sealing materials for chemical tanks. (CWS Tech Div Memo Rept 389). Apr 1942. 26 p. Price: Microfilm-50¢ - Photostat-$2.00
Four samples of self-sealing materials were tested: three internal protection type and one external type. The firing of .50 calibre armor-piercing ammunition into the self-sealing materials produced wounds which permitted the HS (mustard gas) held in the container by the protective panels to seep through. The amount of seepage or leakage was not very great and varied with the self-sealing material used in the panel. The external protection type gave the least amount of leakage; in one instance the wound was practically dry. In every case

where a second shot was fired into the container, the wound caused by any previous shot tended to spurt liquid HE as a result of the compression wave set up by the projectile passing through the liquid in the tank. More tests must be conducted before definite conclusions can be drawn regarding the self-sealing properties of the different compositions. Diagrams, photographs, and tables are attached.

PB 16360. I. G. FARBENINDUSTRIE. Excerpts and short notes on rubber mixtures. (Enlargement print of part of microfilm 182-4) n.d. 47 p. Price: Microfilm-50¢ - Photostat-$4.00
The material consists mainly of formulas for the preparation of rubber mixtures, cements, varnishes, and coatings, most all being taken from patents or patent applications. In German.

PB 16361. I. G. FARBENINDUSTRIE. Verfahren zur herstellung von kunststoffen (Method for the production of artificial materials). (Enlargement print of part of microfilm 182-6) Nov 1932-June 1934. 15 p. Price: Microfilm-50¢ - Photostat-$1.00
Valuable artificial materials with rubber-or-celluloid-like properties can be obtained by polymerization of dichlorobutadiene. The latter is prepared by separation of hydrochloric acid from tetrachlorobutane. This document was prepared for application as a patent. In German.

PB 16344. I. G. FARBENINDUSTRIE. Verfahren zur herstellung von vulkanisierbaren mischungen aus organischen filmbildenden stoffen (Method for production of vulcanisable mixtures from organic substances which form films). (Enlargement print of part of microfilm 182-6) Jun 1937-Sep 1942. 23 p. Price: Microfilm-50¢ - Photostat-$2.00
Viscous to solid, fusible polymers of an unsaturated character are obtained as residues when butadiene or its derivatives are heated to higher temperatures with or without catalysts and pressure. If occasion arises, foreign gases or solvents (benzine, toluene butyl alcohol) or mixtures of solvents might be present. From the product of reaction, the volatile constituents have to be distilled off. Mixtures of organic film forming substances which contain about 4-15% of such polymers of butadiene or its derivatives can easily be treated on rolls and in kneaders, and they have a good absorption for carbon black. In most cases their physical properties improve after vulcanization. These documents concern application for patent. For patent 740067, apparently issued on this subject, see PB 16355. In German.

PB 16355. I. G. FARBENINDUSTRIE. Verfahren zur herstellung von vulkanisierbaren mischungen aus organischen filmbildenden stoffen (Method for production of vulcanisable mixtures from organic substances which form films). (Enlargement print of part of microfilm 182-6) Mar 1941. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
Vulcanisable mixtures of rubber or rubber-like vulcanisable substances have especially good properties if they contain about 4-15% of viscous to solid, polymers which were obtained by heating butadiene in the presence of inorganic, condensing halides. Apparently this document issued as patent 740067, June 6, 1943. For earlier material on the same subject, see PB 16344. In German.

PB 16412. I. G. FARBENINDUSTRIE. Vulkanisierung von isopren (Vulcanization of isoprene). (Enlargement print of part of microfilm 180-3) n. d. 147 p. Price: Microfilm-$1.50 - Photostat-$10.00
Handwritten laboratory note-book recording composition of the mixtures, emulsion polymerization, duration of tests, yields, and results of testing the physical properties. In German.

PB 23022. LIVINGSTON, J. W. Report on Hüls Chemical Works - I.G. Farben, Hüls, Germany - near Marl. (CIOS File XXXI-75, Item 22). Aug 1945. 32 p. Price: Microfilm-50¢ - Photostat-$3.00
The Hüls buna works is the second largest Buna S plant in Germany. The plant was built in 1940 and has a capacity of 4,000 tons per month of Buna S-3 and an equivalent capacity for the butadiene, styrene and Mekal, and the intermediate products required for these materials in the amount necessary for this Buna S-3 production. The base material for butadiene manufacture at Hüls is chiefly the hydrocarbon gases obtained from coal hydrogenation plants at Scholven and Gelsenkirchen, as well as from natural gas wells at Bentheim about 85 miles away. Some gas is also obtained from coke ovens at Auguste Viktoria. These hydrocarbon gases are cracked in an electric arc to produce acetylene and hydrogen. The acetylene is extracted from the reactor gas by water under pressure and the hydrogen and hydrocarbons separated from the remaining gases by the Linde refrigeration and fractionation process. About 20% of the hydrogen produced is used at Hüls for reducing aldol to butol (a material later dehydrated to butadiene), and for producing ethylene from acetylene by hydrogenation. The remaining 80% of hydrogen produced is returned by pipeline to the coal hydrogenation plants. Styrene is produced from ethylene and benzene by the same processes as used at Schkopau and Ludwigshafen. Buna-S-3 is produced by continuous polymerization in a manner similar to the Schkopau and Ludwigshafen plants. Ethylene oxide is produced from ethylene and chlorine over ethylene chlorohydrin and there is a chlorine plant (mercury cells) which produces 3,000 - 3,300 tons per month chiefly for this use. The ethylene oxide is converted to glycol and diglycol --1,600 - 1,800 tons/month of these products. The diglycol is used chiefly for explosives (diglycol nitrate). In addition to the manufacturing operations carried on at the plant, Hüls had facilities for doing quite a bit of experimental work, both in the laboratory and on a half-technical scale. Most of the work which was carried out was along the lines of improving the existing processes at Hüls, but some work was done on developing new products to be made from the Hüls' basic chemicals and the products derived from these materials. Some work was done in the laboratory on the Lebedev process for butadiene from alcohol but this never proceeded very far, and the best yield obtained was 36% butadiene by weight from the alcohol charged. This report is the original of PB 13357, issued as Office of Rubber Reserve Rept CR-811, CD-459, Sep 1945, and abstracted on page 1202, this Bibliography. This report gives more information than PB 13357.

PB 23385. U. S. STRATEGIC BOMBING SURVEY. Synthetic rubber plant, Huels, Germany; Chemische Werke, Huels. (Rept 128; Plant Rept 4). Feb 1946. 91 p. Price: Microfilm-$1.00 - Photostat-$7.00
The Huels Synthetic Rubber Plant, operated by the I. G. Farbenindustrie, is located on the northern fringe of the Ruhr district about 20 miles north of Essen. It represents the latest and most modern design in German synthetic rubber plants and had a production of as much as 3,900 tons per month. It was the second largest Buna plant operating in Germany, capable of producing about one third of the synthetic rubber needed to cover the German war program, internal economy, and exports to Sweden and the Balkans. This report discusses the plant and its importance, air attacks and the effects of bombing, production losses, vulnerability and recuperability of plant. It also includes a brief description of processes and equipment in rubber synthesis, preparation of butadiene, styrene, Buna, and ethylene glycol. Exhibits and supplementary material referred to are not included in this report but are available in the files of the Strategic Bombing Survey.

PB 22219. U. S. WAR DEPARTMENT. Vulcanizing equipments TE-54-A, TE-55-A, TE-54-B, and TE-55-B. (Tech Manual 11-367) Dec 4, 1944. 35 p. Price: Microfilm-50¢ - Photostat-$3.00
Subject equipments are used for splicing and patching Signal Corps cables WC-534, WC-535, WC-548, and also for splicing two cables WC-534 to one cable WC-535. This latter operation is referred to as potheading. The equipment is contained in a chest made of plywood, and consists of the following: Vulcanizer kit box, two sizes of bronze splicing

sleeves, gray insulating tape, black vulcanizing tape, rubber cement, two sizes of rubber tubing, rosin-core solder, soldering paste and wax mold dressing. This manual contains sections covering description, installation and operation, functioning of parts and maintenance. Photographs and sketches are included.

STONE, CLAY, AND GLASS PRODUCTS

PB 19661. BRITISH INTELLIGENCE OBJECTIVES SUB-COMMITTEE. Mica merchants. (Evaluation Rept 395) Feb 1946. 2 p. Price: Microfilm-50¢ - Photostat-$1.00
Report describes results of visits to mica dealers to ascertain the position of mica in Germany, particularly with reference to stocks and their location. Hans Malmberg of Hamburg stated that no usable mica could be found in Germany. Only inferior Norwegian mica could be found and that was not suitable for electrical work. The Possehl Erz-und Chemikalien-Handelsgesellschaft plant at Hamburg originally bought mica from London and during the war obtained only Norwegian mica. The ersatz material, Stertit, in their opinion, gave very good results when used for spark plugs.

PB 22815. PRENTICE, T. M. "Schmelts" cement. (Naval Tech Mission in Europe Tech Report 286-45) Aug 1945. 7 p. Price: Microfilm-50¢ - Photostat-$1.00
"Schmelts" cement is so called because the materials are melted before being finely ground. It is high early strength cement manufactured by the Hochofen Cement Werk in Lübeck. Tests were first made of Schmelts cement imported from Hungary in 1927. Until about the year 1930 the material was imported from Hungary and Belgium, and it was about this time that production was started in Germany. At the cessation of hostilities, the above mentioned concern was the only firm in the Reich producing this cement. This report gives its composition properties and results of tests. Enclosures A, B and C mentioned in the report are missing, but the enclosure D is a report on the testing of a sample of "Schmelts" cement for the German Navy. Enclosure E is a laboratory work sheet giving a record of tests made for the German Navy. Both of these enclosures are in German.

PB 9296. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Verfahren zur herstellung eines keramik-ersatz-werkstoffes. (Procedure for manufacturing a substitute ceramic material). Application T 59639 IVc 39b. October 7, 1943 and still pending. Original inventor Luda. 1943. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
Not illustrated.

STRUCTURAL ENGINEERING

PB 23760. BOWMAN, H. L. Portable overpass. (OSRD Rept 224) Sep 1941. 8 p. Price: Microfilm 50¢ - Photostat-$1.00
This report consists of three drawings made by Carson and Carson, of Philadelphia, in partial fulfillment of a contract for the National Defense Research Committee in response to a request received from the Engineer Board of the Corps of Engineers, United States Army. The request was for a portable overpass, of welded design, conforming to the following military characteristics: (1) No section to exceed 30 feet in length and 11 feet in width; (2) vertical clearance of center span should not be less than 12 feet; (3) clear width of roadway between curbs should be at least 8 feet; (4) overpass should be capable of supporting an H-15 loading; (5) ramp grade should not exceed 25%; and (6) center section should be designed to permit use of one or more sections in a single structure. Brief additional information regarding the contract is included.

PB 19797. BRIGHAM, GEORGE G., Jr. The Brigham system of prefabricated building construction: Final progress report. Sep 1944. 24 p. Price: Microfilm-50¢ - Photostat-$2.00
Studies and experimental investigations were carried out at the University of Michigan under WPB contract in connection with developing an efficient method of joining single thickness wall materials of the Cemesto Board type in small housing construction to provide a low cost, easily assembled structure for the purpose of economizing in both materials and manpower. Research described in this report was a continuation of previous independent studies of George B. Brigham, Jr., toward developing a building system which could replace the expensive, traditional, wood frame construction with a system of factory-fabricated building parts capable of being erected at the building site without cutting or fitting, by relatively unskilled labor, using very simple tools and without heavy lifting equipment. Assembly, manufacture, distribution, and site erection process are among the subjects discussed in the report. This research resulted in devising a new system of construction whereby a house or other building of moderate size could be completely erected with standardized factory prefabricated parts requiring, with minor exceptions, no cutting or fitting at the site. Photographs and construction drawings are included.

PB 19796. BRIGHAM, GEORGE B., JR. Experimental investigations in connection with a study of the Youtz unit system of construction: Final progress report. Sep 1944. 76 p. Price: Microfilm-$1.00 - Photostat-$6.00
The research described in this report was first proposed to the Office of Production Research and Development by Philip N. Youtz, who had made previous studies which convinced him of the practicality of building a house in self-contained units of truckable size. The research executed under this contract, WPB113, at the Department of Engineering Research, University of Michigan, involved the development and testing of the unit system proposed by Mr. Youtz. Results of research are presented in the six phases into which the work was originally divided. 1. Development of drawings to determine whether this system of construction was flexible enough to satisfy requirements of domestic architecture. 2. Development of a structural technique using basic idea of Youtz Unit. 3. Testing of structural technique by means of a small but full-size model. 4. Production of a dwelling composed of three Youtz units in order to test the assembly of units, the disassembly and reassembly of the first unit, an integral heating system and numerous suggested revisions. 5. Production of full-size house large enough to demonstrate the system completely. This part discusses factory prefabrication of the parts, erection, substitutions, manufacture and distribution of Youtz unit building, and cost prediction. 6. Drawings describing completely the structural technique used to produce the demonstration house (these are included in the report). Photographs are also given.

PB 19135. U. S. WAR DEPARTMENT. Roofing, repairs and utilities. (Tech Manual 5-617). Jun 1945. 38 p. Price: Microfilm-50¢ - Photostat-$3.00
This manual discusses the principal causes of failures of roofs on Army buildings, outlines methods of repairing and renovating roofs and flashings, and describes reroofing. The emphasis is on roofs used on mobilization and theater of operations buildings erected during the past few years. Photographs and diagrams illustrate various types of roofs and the methods of repairing them.

PB 18998. U. S. WAR DEPARTMENT. CORPS OF ENGINEERS. Construction and routes of communication. (Field Manual 5-10) Jan 1944. 600 p. Price: Microfilm-$6.00 - Photostat-$40.00
This manual covers principles and methods of construction, and routes of communication in the theater of operations. It includes road, railway, and timber bridge design and construction; port lay-out and barging operations; advance landing field construction and maintenance; hasty reinforced concrete construction; and summarizes the characteristics of standard stream-crossing equipment. Drawings, sketches, illustration, tables, and charts are included.

PB 19067. U. S. WAR DEPARTMENT. CORPS OF ENGINEERS. ENGINEER BOARD. Construction of runways, roads, and buildings on permanently frozen ground. (Tech Bulletin 5-255-3) Jan 1945. 64 p. Price: Microfilm-$1.00 - Photostat-$5.00
This bulletin presents the best information now available on reconnaissance, design, construction, and maintenance for successful work in areas where permanently frozen ground exists. Contains chapters on reconnaissance and site selection, roads and airdromes, buildings, water supply and distribution, and sewerage. Photographs and drawings.

PB 19090. U. S. WAR DEPARTMENT. CORPS OF ENGINEERS. ENGINEER BOARD. Use of road and airdrome construction equipment. (Tech Manual TM-5-252) Jan 1945. 280 p. Price: Microfilm-$3.00 - Photostat-$19.00
This technical manual, written for officers and noncommissioned officers responsible for road and airdrome construction, tells how to use available equipment and personnel most efficiently, and how to plan, schedule, and supervise specific jobs. Chapter I covers basic considerations; Chapter II discusses construction operations and assignment of equipment; Chapter III covers characteristics and capability of equipment and discusses all pieces of equipment organic and immediately available to engineer units normally engaged in road and airdrome construction. Chapter IV covers construction aids, explaining the use of lighting, improvised equipment, explosives and construction drainage and hydraulic methods as aid to expedite construction operations; Chapter V discusses capabilities and use of labor; Chapter VI is on the planning construction of improved roads and airdromes; Chapter VII covers pioneer roads and advanced landing fields. Many photographs, diagrams and tables of data are included.

PB 23097. WERNISCH, G. R. and ERIKSON, R. E. Harbor and graving dock construction, Kriegsmarine, Wilhelmshaven, Germany. (U. S. Naval Tech Mission in Europe Tech Rept 506-45) Oct 1945. 49 p. Price: Microfilm-50¢ - Photostat-$4.00
This investigation report contains general information on harbor and graving dock construction, and specific construction information on the Wilhelmshaven harbor and graving docks. The investigators mention in their report, that new types of structures or equipment were not evident and that nothing new or unusual was found. The report describes construction and operation of the graving dock at Wilhelmshaven and contains detailed drawings with German text of all harbor plans, graving docks, pump houses, quays, wharves and bridges. Photographs show various harbor cranes, graving docks, and graving dock caisson gates. Most of the drawings with German text will not reproduce well.

TRANSPORTATION EQUIPMENT

AERONAUTICS

Aircraft

PB 22105. GREEN, JOHN W. The motion of an airplane immediately following the release of a bomb. (Aberdeen Proving Ground Ballistic Res Lab Rept 490) Sep 1944. 17 p. Price: Microfilm-50¢ - Photostat-$2.00
This question is of interest in determining the interval of time between the closing of the bomb release circuit and the actual release of the bomb by the rack - the rack lag. This is done by recording a signal, as the bomb drops, from a photoelectric cell placed in the bomb bay near the rack and computing the time, using the known distance of the rack above the photoelectric cell. Since the plane is vertically accelerated as soon as the bomb is released these computations may be in error, sometimes as much as .05 sec. This paper presents an analysis of plane motion after bomb release and gives a method for determining the position of the photoelectric cell at any small time after release of the bomb. Tables to be used in determination of rack lag in a number of airplane types are also presented.

PB 22001. GRENELL, L. H. and others. Examination of enemy materiel (OD-113) (AC-77) (M-119): Metallurgical examination of float strut from Japanese aircraft "Paul". Progress report 191, Jun 22, 1945. (OSRD Rept 5411; War Metallurgy Committee Rept M-568) Aug 1945. 10 p. Price: Microfilm-50¢ - Photostat-$1.00
The strut arm was forged from Alcoa 24S type alloy. Physical properties were in line with those of an Alcoa 24S alloy with an HT heat treatment. Skin sections on the leading edge were also of Alcoa 24S type duralumin and were alclad 0.001b". The steps, which folded out of and formed a part of the leading edge, had stepping surfaces pressed from commercially pure aluminum sheet, reinforced by steel stampings. Steel parts, except for the arm bushings which were of low-alloy content, were plain-carbon steel stampings assembled with welds. There were no obvious defects or reasons for failure of the strut arm. It appears likely that the sections were too small to carry the loads. The use of wooden shims and low-carbon steel stampings is not in line with Japanese use of best quality materials and workmanship in manufacturing aircraft parts. This examination was made at Battelle Memorial Institute. Photographs and tables of data are included.

PB 22010. GRENELL, L. H. and others. Examination of enemy materiel (OD-113) (AC-77) (M-119): Metallurgical examination of German and Japanese bushings and oil lines. Progress report 185, Apr 29, 1945. (OSRD Rept 5200; War Metallurgy Committee Rept M-539) Jun 1945. 6 p. Price: Microfilm-50¢ - Photostat-$1.00
The German aircraft bushing was machined from an alloy of the Swiss Anticorodal "T" type. This alloy has greater strength than Alcoa T8 alloy, with about the same corrosion resistance. The bushing was anodized and the coating impregnated with a yellow dye, probably for alloy identification. All of the Japanese aircraft fittings examined were machined or drawn from Duralumin barstock or sheet, respectively. The posts were anodized, some showing a chromate-type treatment. The oil lines were wound with either brass wire or zinc-coated steel wire. The cable body was composed of several layers of fabric, rubber, and plastic. All of the cables had a copper ground wire along the length of the cable to reduce radio static. The details of manufacture are given in Table 1, and photographs are included.

PB 22329. HEUSSNER, C. E. and others. Examination of enemy materiel: Metallurgical examination of landing wheel and strut, wing sections, and components from Japanese aircraft "Frances". Progress report 165, Mar 15, 1945. (OSRD Rept 5020; War Metallurgy Committee Rept M-513) May 1945. 36 p. Price: Microfilm-50¢ - Photostat-$3.00
Fifty-four percent of the "Frances" parts were manufactured from steel, 38 percent from aluminum alloys, 4 percent from copper alloys, 1 percent from a magnesium alloy, and 3 percent from rubber and leather. The parts were fabricated by the conventional methods of machining, forging, stamping, deep drawing, and extruding. Gas and arc welding were used in the landing strut. In general, the materials, fabricating practices, and welding techniques were of good quality. The Frances is a late naval operational torpedo bomber, dive bomber, and reconnaissance plane. Photographs and tables are included.

PB 22272. HUSS, HARRY O. Tests of airplane smoke tanks M12 and M12A1 with an A-20A airplane. (CWS Tech Div Memo Rept 293) Jun 1941. 53 p. Price: Microfilm-$1.00 - Photostat-$4.00
The object of the tests described in this report was to determine the adaptability of the subject tanks to an A-20A (Douglas) airplane, the effect of these tanks on the performance of this airplane and the character of patterns produced from the distribution of liquid from these tanks during flight at the maximum speed of the airplane. As a result of the tests it was recommended that the M12 tank should have preference over the M12A1 tank. This report is illustrated with photographs of tests, test panels, and tank installations, tables, and drawings.

PB 4879. JACOBS, H. H. and HALL, C. L. Test of 1/22-scale model Bell Aircraft Corporation XFM-1 airplane proposed multiplace fighter, twin engine pusher type (Five foot wind tunnel test no. 167). (AAF ATSC Tech Rept 4247) Aug 1936. 36 p. Price: Microfilm-50¢ - Photostat-$3.00
This test was made to determine the aerodynamic characteristics of the Bell Aircraft XFM-1 Airplane. The 1/22-scale model of the XFM-1 airplane, a multiplace fighter, internally braced, twin engine pusher type monoplane, was designed and built by the Bell Aircraft Corporation, Buffalo, New York. All dimensions are given for the model, and the full scale airplane. The report describes in detail the various tests, and contains: 1 complete wind tunnel nomenclature, 7 tables tabulated data, 7 diagrams plotted data, 4 vector diagrams, and 5 photographs showing various views of the scale model. The model did not have gun turrets, radiator, or oil coolers, so the maximum speed indicated in the test 327 m.p.h. is probably too high.

PB 22156. NOLEN, J. T. Tests of the M-10 spray tank mounted on the P-38, P-39, P-40, and A-36 airplanes. (CM Tech Div Memo Rept 584) Mar 1943. 53 p.
Price: Microfilm-$1.00 - Photostat-$4.00
The object of the work described in this report was to develop satisfactory methods of mounting the M-10 spray tank on the above named airplanes in such a manner as to avoid structural interference, to cause the minimum amount of contamination of the airplane on discharging the contents of the tank, and to obtain spray panel data for each airplane flying at various speeds: The installation of the tank on the four planes and the method used for checking contamination of the planes and obtaining spray panel data are described. It was found that two tanks could be hung directly to the bomb racks of the P-38 airplane, and by using the adapter, E-1, one tank could be mounted underneath the fuselage of the P-39. By using the same adapter, E-1, designed for the P-39 plane, but in the reversed position, one tank could be hung underneath the fuselage of the P-40 airplane. Two tanks could be hung directly to the bomb racks of the A-36 plane. The size of the spray particles seemed to decrease slightly with airplane velocity. Photographs of airplanes, adapter, tanks in position and of spray panels are included.

PB 4883. SMILG, B. The determination of the product of inertia of aircraft control surfaces. (AAF ATSC Tech Rept 4321) Jul 1937. 33 p. Price: Microfilm-50¢ Photostat-$3.00
The object of this report is to indicate the physical significance of the product of inertia of aircraft control surfaces; to derive the methods for calculating the product of inertia with respect to one set of axes, given its value with respect to a different set of axes; and to discuss various methods of determining the product of inertia experimentally. Three methods are fully described, and eight figures are included.

PB 4734. STAROS, BASIL. Determination of blade sections for combination high speed high altitude wind tunnel. (AAF ATSC Memo Rept EXP-M-51/M850-2) Aug 1942. 6 p.
Price: Microfilm-50¢ - Photostat-$1.00
This report presents the procedure underlying the selection of airfoil sections for the fan blades of the Wright Field combination high speed, high altitude, wind tunnel. Appendix 1 describes blade section determination, it contains a diagram showing fan blade section nomenclature, equations from which the data has been calculated, and table 1, tabular data for fan blade section design.

PB 4733 WATTENDORF, FRANK L. and CLARK, JAMES. A study of the influence of prerotation vanes on the torsional deflection of wind tunnel fan blades. (AAF ATSC Memo Rept EXP-M-51/M674-5) Aug 1941. 27 p. Price: Microfilm-50¢ - Photostat-$2.00
This report presents an analysis of the motion of an airfoil vibrating about its torsional axis in a periodically disturbed air stream, with particular application to fan blades operating behind prerotation vanes. It develops general expressions from which angular deflection may be calculated for conditions of torsional resonance. Appendix 1 discusses derivation of an expression for work input during torsional vibration of fan blades. Appendix 2 discusses derivation of an expression for work absorbed by aerodynamic damping during torsional vibration of fan blades. Appendix 3 discusses derivation of an expression for work absorbed by material damping during torsional vibration of fan blades. Appendix 4 discusses angular deflection of fan blade tip at torsional resonance. Appendix 5 contains seven figures showing characteristics of wake downstream of prerotation vanes and the corresponding variation in loading of the fan blades.

Engines and Propellers

PB 22480. CHILTON, T. H. and LAPPLE, C. E. Removal of dust from air supplied to aircraft engines: Final report, Jan. 22, 1943. (OSRD Rept 1178) Feb 1943. 92 p.
Price: Microfilm-$1.00 - Photostat-$7.00
This study describes the development of a device for removing dust from the air intake of aircraft engines, which would require less space than air filters already in use. A duct skimmer, cowling skimmer, and channel air filter were studied, the cowling skimmer being found most effective. It is a centrifugal separator which is very simple, requires no cleaning, and removes a high per cent of particles of various sizes. It can be used on planes on which filters can not be used because of space limitations. A full discussion of the testing, including an analysis of theoretical considerations involved in the various devices, is followed by tables of summaries of results. Photographs, charts, graphs and detailed drawings of the various devices showing test arrangement are included.

PB 22326. GRENELL, L. H. and others. Examination of enemy materiel: Metallurgical examination of Japanese Sakae-12 engine No. 124676. Progress report 156, Feb 12, 1945. (OSRD Rept 4983) Apr 1945. 56 p. Price: Microfilm-$1.00 - Photostat-$4.00
The study of the Sakae-12 engine done at Battelle Memorial Institute, revealed a number of changes in material and some changes in manufacturing methods over those employed in Sakae engines of earlier manufacture. The steels used were clean, of electric furnace quality, and nearly all were alloyed. Molybdenum and chromium were the most commonly used alloying materials, and these were found in nearly all of the steels. High nickel contents were found in nearly half of the steels, although the number of applications where nickel steels were used was reduced by half, in comparison with earlier engines. The variety of bearing materials showed careful selection and attention to the needs of individual applications. Fabrication practices did not show any great changes when compared with those in earlier engines. An examination of heat treatment employed showed a wide use of case hardening, nitriding, and, in one case, induction hardening. Included are details of findings in the examination of the various parts, discussion of economic considerations, photographs, microphotographs, and tabulated data.

PB 22621. GRENELL, L. H. and others. Examination of enemy materiel (OD-113; AC-77): Metallurgical examination of a Japanese Sakae-21 aircraft engine. Progress report 107, Aug 8, 1944. (OSRD Rept 4234; War Metallurgy Committee Rept M-384) Oct 1944. 110 p. Price: Microfilm-$1.50 - Photostat-$8.00
This report covers the examination at Battelle Memorial Institute of the subject Japanese aircraft engine taken from a Hamp, Mark II, fighter aircraft which was captured at Munda, New Georgia, in August, 1943. The material and workmanship used throughout the engine were found to be of excellent quality, and no apparent effort was made to conserve either critical materials or man-hours of labor. Alloy steels were used extensively, the majority of electric furnace quality. Phosphorus and sulphur contents were low, and the steels were clean and free from dirt. The aluminum alloys used were standard alloys similar to American materials. Forging and welding were used extensively. Ingenuity was shown in the solution of some problems by adapting unusual metals to special service conditions as described in this report. Detailed descriptions, discussion of findings and economic considerations, photographs, and tabulated data are included.

PB 22009. GRENELL, L. H. and others. Examination of enemy materiel (OD-113) (AC-77) (M-119): Metallurgical examination of Japanese Homare-11 aircraft engine no. 11515. Progress report 178, Apr 28, 1945. (OSRD Rept 5199; War Metallurgy Committee Rept M-538) Jun 1945. 61 p. Price: Microfilm-$1.00 - Photostat-$6.00

The highly stressed parts of this radial aircraft engine, almost without exception, were made from alloy steel of basic open-hearth or electric manufacture. The steel was clean and of satisfactory aircraft quality. Three general types of alloy steel were used: Cr-Ni-Mo, Cr-Mo, and Nitralloy. The first two of these types were similar to the SAE-4300 and 4100 series, respectively; however, each part analyzed showed twice the chromium content and some had higher Ni and Mo as well. The heat treatment of all steel parts appeared to have been satisfactory. There was a tendency to maintain or increase the ultimate strength of major parts, particularly in the propeller shaft where the ultimate was raised to 184,000 pounds/square inch. Nitriding and carburizing were used extensively to protect wearing surfaces. The variations in hardnesses of the three crankshaft sections, and in groups of highly stressed bolts, such as the cylinder hold-down studs, were always found to be small. Satisfactory metallurgical control was indicated. Magnesium castings, which customarily have been used for lightly stressed housings and for the supercharger diffuser, were replaced in this engine with aluminum castings. Aluminum pistons apparently were made by forging cast blanks. The aluminum cylinder head alloy containing no nickel was unusual. Manufacturing methods employed in making this engine showed a number of novel practices and applications of new materials. Shot-peening of parts to improve fatigue life was observed for the first time on the starter ratchet and tail shaft. Chromium plating was used on the main bearing wedges, apparently to reduce fretting. Since the engine had been run very little, the effectiveness of the chromium plating could not be determined. Aluminum tin and aluminum silicon copper alloys were used for relatively important bearings. A Pb-Sn-Zn-Cu alloy, similar to 85-5-5-5 metal, was used for piston pin bearings. Synthetic rubber similar to Thiokol was used to protect ignition wiring, and a novel barium porcelain was employed in the spark plug connectors. The method used to secure corrosion protection differed considerably from previous Japanese aircraft engine practice. In place of cadmium, zinc was used on numerous steel parts for corrosion prevention, and also to prevent galling on splined surfaces. In contrast, cadmium plate was used on the cylinder barrels which previously had been protected by paint. Tabulated data on the power section of the engine and on results of chemical and spectrographic analyses are given. Additional tables, photographs and graphs are included. This examination was made at Battelle Memorial Institute.

PB 22320. GRENELL, L. H., and others. Examination of enemy materiel (OD-113; AC-77; M-119): Metallurgical examination of two Japanese Kussi engines models 11 and 15. Progress report 155, Jan 24, 1945. (OSRD Rept 4828; War Metallurgy Committee Rept M-488) Mar 1945. 59 p. Price: Microfilm-$1.00 - Photostat-$4.00

Design and construction of these engines followed good metallurgical practice, with no startling innovations. The choice of materials and the microstructures produced departed only slightly from the customary Japanese standards shown by other engines examined. The light metal parts of the engine were especially notable because of the interchangeability of aluminum and magnesium. Thus, the blower case of model-11 was cast magnesium, and that of model-15 was cast aluminum. Similarly treated were the nose casting, cam housing, and gear case. In some cases, as noted in the separate sections, the patterns had not been changed. Another interesting particular was the use of a selenium treatment for the magnesium diffuser. Although some protective treatment was necessary, the use of selenium coatings has not yet been widely adopted in this country. The use of 9 percent Si-Al alloy, rather than 4 percent Cu-Al alloy, for the blower case and nose casting, represented a slight departure from a general tendency; but there are other examples of these same parts being made from the silicon alloy. In the heavy nonferrous parts there were few parts of interest. One of these was a bearing made from powdered metal for the magneto drive gear. Another was the bar stock and cast lead bronze for bearings in the two engines; that is, in model-15 the gear bearings were cast but the clutch shoe attachment bearings (Part No. 58-1) were of bar stock. In model-11 the reverse was true. Although the same materials were used for the valves, the exhaust valve seat inserts differed markedly, model-15 having higher chromium and much lower manganese in the stainless steel. The finishing of the various parts of the engine conformed to the usual high standards of the Japanese engines previously examined, although the examination of model-15 resulted in an impression of somewhat less care. The pistons were anodized, as were various minor external aluminum parts. Photographs and tables are included.

PB 22408. TAYLOR, W. L. C. and others. Interrogation of Dr. Otto Cuno. (BIOS Final Rept 62, Item 28) Jul 1946. 7 p. Price: Microfilm-50¢ - Photostat-$1.00

Dr. Cuno was questioned concerning the manner in which the four valves, two sparking plugs and the injection nozzle are located in the cylinder head of the Jumo 213J. Free-hand sketches illustrate the text. A sketch of the Zündkammer or ignition chamber used to provide very high altitude ignition is also included with a description.

LAND TRANSPORTATION

PB 5302. BECKER, P. The achievements of the "Best-Railroad Car" during the war. (Translation). n.d. 7 p. Price: Microfilm-50¢ - Photostat-$1.00

This article, a translation from the German, briefly describes some new railway equipment built during the war. 56,000 four axle open railway freight cars, "Villacher Wagen," were built immediately after the campaign of Poland, for the purpose of moving great quantities of goods accumulated in numerous places, but above all, for moving coal stocked up in the Ruhr. A light 4-axle frameless tank truck for the transport of mineral oils was built beginning in 1940. For transporting Panthers and Tigers a railway truck was used first immediately after the great raid on Cologne May 31, 1942. A standardized turn-table for freight cars and a light tender for war locomotives were developed as was a 4-axle high speed freight car of the R.R. category developed in 1942 to handle freight at a speed of 120 Km. (=75 miles per hour) and to serve mainly the widened sphere of traffic (Grossraumverkehr).

PB 22683. U. S. ENGINEER BOARD. Shock absorbers and spring performance for the searchlight trailer M-1. (Interim Rept 657) Mar 1942. 13 p. Price: Microfilm-50¢ - Photostat-$1.00

The object of the tests covered by this report was to determine the performance characteristics of special leaf springs No. 564822 supplied by the Fruehauf Trailer Company, and to compare the results with the springs as originally supplied on the M-1 trailer. Procedure and findings of tests are described. It was concluded that these special springs, though having a lower spring rate than the standard spring, develop the same ride characteristics for the loading under consideration because of preloading and changing the points of intersection of the characteristic curves; also that the question of friction or interference to free motion in the vertical guides and slides cannot be thought of apart from the proper spring application to the trailer. Sketch and graphs and charts presenting test data are included.

PB 19129. U. S. WAR DEPARTMENT. Tractor, wheeled, gasoline (Hebard "A-3 victory"). (Tech Manual 10-1661) Aug 1, 1945. 235 p. Price: Microfilm-$2.50 - Photostat-$16.00

This three wheeled warehouse tractor is powered with a 30.5 brake horsepower, 4 cylinder gasoline engine which is bolted to a one-piece, integral transmission differential and axle housing. It has a one-piece unit fabricated and welded sheet steel body which encloses the engine and drive unit, and is attached to a steel beam frame. An automatic coupler is provided for towing trailers. A full description of the vehicle and its controls, is followed by instructions for the operation, maintenance, and repair of the equipment, the engine and their components. A trouble shooting chart, instructions for shipping and storage, and a complete parts list are given. Photographs, charts, diagrams, parts assembly drawings, and tables are included.

MARINE TRANSPORTATION

PB 22947. ADAIR, J. Hydraulic couplings for marine main drives. (Naval Tech Mission in Europe Tech Rept 496-45). Sep 1945. 21 p. Price: Microfilm-50¢ - Photostat-$2.00
This report of the Naval Technical Mission in Europe provides an analysis of the workings and advantages of hydraulic couplings between main engines and propellers in internal combustion engines for marine propulsion, is followed by descriptions of those designed for installation with MAN 24-cylinder 2-cycle engines in uncompleted German Diesel powered destroyer L-51 and for projected Diesel powered battleships. Photographs, graphs, mathematical formulas and drawings are included.

PB 22803. ELA, D. K. Report on welding in German shipbuilding. (Naval Tech Mission in Europe Tech Rept 195-45) Aug 1945. 77 p. Price: Microfilm-$1.00 Photostat-$6.00
This report deals primarily with naval welding in shipyards. Shop methods in machinery construction are not included and only a few remarks apply to nonferrous welding, namely, 99.8 percent pure aluminum. German methods and specifications are very similar to our own, and their materials are similar or inferior because of shortages in alloys. Though standards were relaxed and materials poorer because of wartime exigencies, the work remained good. Production methods were not as advanced as in the United States except in submarine assembly. There has been no development of high current coated electrodes for position work and little work of a research nature has been conducted. Improvement in design and wider application of automatic welding processes have been undertaken with good results especially in simplifying the machines. This report discusses DIN and Navy specifications, types of electrodes and production methods used. Part I of Appendix presents specifications with drawings and Part II, X-ray records, all in German. Photographs are also included.

PB 22578. TIDELAAR, J. H. and WANGAARD, F. F. The use of wood in the construction of German torpedo boats: E-boats and hydro-boats. (FIAT Final Rept 86) Aug 1945. 6 p. Price: Microfilm-50¢ - Photostat-$1.00
Two types of torpedo boats were built in Germany during the war: 1) The E-boat and (2) the hydro-boat. The E-boat was sturdily built and larger (113-ft. long) than the American PT boat. Its construction consisted of the application of a lumber planked hull over an aluminum alloy framework. The use of solid timbers for keel and stem, steam-bent frames, and lumber planking involved no new methods and was conventional in all respects. Plywood was used for interior fixtures. The hydro-boat was much smaller (42 ft. long) and lighter in construction throughout. Typical sawed-frame construction was employed with a lumber-planked hull. Plywood gusset plates were used to join the separate members of the sawed frames and plywood was also used for decking and for interior fixtures. No laminated construction was employed in either type of boat, and Kaurit cold-settling ureaformaldehyde resin was used for the limited amount of gluing done in connection with the application of gussets and scarf jointing of stringers in the hydro-boat. Both types were built by conventional methods. The greatest change resulting from war conditions was the necessary substitution of native timber species for the more commonly used imported boat building woods. This information was based on observations of several partially completed boats at the Schlichting Boat and Yacht-bau, Travemünde and the F. L. Lurssen Yacht and Bootswerft, Vegesack.

PB 18963. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Diesel-electric direct current drive for surface ships, basic principles. (NAVSHIPS 250-660-3). Jun 1945. 142 p. Price: Microfilm-$1.50 - Photostat-$10.00
Basic instruction on the principles of propulsion of surface ships by Diesel-electric drive and the operation of this unit is given in the form of questions and answers, with the basic formulas worked out in detail and illustrated graphically. Equations are fully explained, and reasons for each step are given. Photographs, tables, charts, graphs and diagrams are given.

PB 18964. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Turbine electric drive, basic principles. (NAVSHIPS 250-660-2). Mar 1945. 118 p. Price: Microfilm-$1.50 - Photostat-$8.50
Basic instruction on the principles of ship propulsion by turbine electric drive and the operation of this unit is given in the form of questions and answers, with basic formulas worked out in detail and illustrated graphically. Each step from power source to propulsion is worked out in detail and reasons for each are given. Photographs, diagrams, graphs and charts are given.

PB 19125. U. S. WAR DEPARTMENT. Engine, Diesel, marine, Atlas Imperial, model 6HM464. (Tech Manual 55-1027). May 25, 1945. 193 p. Price: Microfilm-$2.00 - Photostat-$13.00
This comprehensive handbook presents an explanation of the operating principles of this 120 horsepower, 6-cylinder, 7½-inch bore, 10½-inch stroke marine Diesel engine, and its lubrication, engine cooling and fuel systems, is followed by instructions for the operation and maintenance of the engine and its component parts. A section on the reconditioning of an engine that has been submerged in salt water, and a trouble shooting chart are appended. Labeled photographs, charts, diagrams and tables are included.

PB 19126. U. S. WAR DEPARTMENT. Engine, Diesel, marine, Atlas Imperial, model 6-HM-3358. (Tech Manual 55-1051) Feb 12, 1945. 59 p. Price: Microfilm-$1.00 Photostat-$4.00
This engine is a heavy duty, solid injection full Diesel type marine engine. The 6 cylinder, 15 inch bore, 19 inch stroke engine develops 600 hp at 300 rpm. Following a description of the engine and data for attached auxiliaries are instructions for the installation, operation and maintenance of the engine and its components. Charts, diagrams and photographs are included.

PB 19124. U. S. WAR DEPARTMENT. Instruction manual for Atlas Imperial Diesel engine, model 6HM2124. (Tech Manual 55-1026). Dec 20, 1943. 207 p. Price: Microfilm-$2.50 - Photostat-$14.00
An explanation of the operating principles of this 400-horsepower, 6-cylinder, 13-inch bore, 16-inch stroke marine Diesel engine, and its lubrication, engine cooling and fuel systems, is followed by instructions for the operation and maintenance of the engine and its component parts in this fully illustrated handbook. A section on the reconditioning of an engine that has been submerged in salt water, and a trouble shooting chart are appended. Labeled photographs, diagrams and tables are included.

PB 22926. WEHNISCH, GEORGE R. German floating dry docks. (Naval Tech Mission in Europe Tech Rept 371-45). Sep 1945. 56 p. Price: Microfilm-$1.00 - Photostat-$4.00
This report contains detailed information on a 40,000 metric ton floating dry dock. It also gives general information on special lifting docks known as "Hebewerk" (Lifting mechanism), a 60,000 metric ton dry dock and a pressure floating dock used for testing submarine hulls. A general discussion of floating dry docks with Kriegsmarine (Navy war) officials is also included. Included are forty-five photographs and plans, most of which may not reproduce well.

MISCELLANEOUS

German

PB 19675. BARTLETT, G. and TAYLOR, M. A. Sewing needles and pins. (BIOS Evaluation Rept 425) Feb 1946. 2 p. Price: Microfilm - 50¢ - Photostat - $1.00

A brief report is given on each of the following manufacturers of needles and pins: Stephan Witte and Sohn, Iserlohn, Westphalia; Paul Dossmann, Iserlohn; Hugo Heusch and Huhn, Aachen; and Stephan Beissel, Aachen. Standard needle making equipment was used in all plants. Of special interest were an automatic machine for milling form cutters, and types of jigs and machines used for pointing boot and shoe needles, at Hugo Heusch and Huhn.

PB 22819. BROWN, T. S. Information on manufacture of oil seal rings (Simmer rings). (Naval Tech Mission in Europe Tech Rept 375-45). Sep 1945. 5 p. Price: Microfilm-50¢ - Photostat-$1.00
This report is a brief description of the manufacture of "Simmer Rings", and a record of disposition made of drawings and samples removed from the plant of Walter, Hans, Otto and Richard Freudenber, Weinheim, Germany. These seals are used for preventing leakage of oil from bearings, for hydraulic packing and for other sealing purposes on rotating and reciprocating shafting of all types and sizes which operate within the temperature limitations of the rubber or leather used in the manufacture of the rings.

PB 17247. ELSÄSSISCHES EISEN-UND STAHLWERK, STRASSBURG. Stossofen (Heating furnace) MIS VII 67g 7000413) Mar 1944. 21 p. Price: Microfilm-50¢ - Photostat-$2.00
This report consists of an outline drawing of a heating furnace for iron ore from the Alsace Iron and Steelworks at Strassburg.

PB 18232. GERMANY. REICHSFORSCHUNGSRAT. Administrative correspondence on personnel and budgetary matters. (ALSOS Mission, RFR 714). 1944-1945. 145 p. Price: Microfilm-$1.50 - Photostat-$10.00
This important file not only reveals the statutes, the regulations of the Reichsforschungsrat but it also shows the complete set up of German scientific research for the totalitarian war effort under the leadership of Göring as president, Dr. Görnnert as his personal adviser, Dr. Mentzel as head of the council and SS-Standartenfuehrer Sievers as his deputy. All reports are marked "secret". Of special interest are those on the unification of the Biology Section under H. Weber, Strassburg (Alsace), the mathematical library in Wolfach, Black Forest, and the Research Institute on Fats, founded by Göring on Oct 17, 1944 in Münster (Westphalia). The correspondence shows how captured Russian scientists were used for German research work under Army command and also the usage of captured Russian scientific material through Forschungsstelle Babelsberg under its head, Heereskriegsrat Dr. Pietsch, Berlin. The leading personalities of the WFO (Wehr-Forschungs Gemeinschaft) founded in August 1944 by Göring, Himmler and Bormann are mentioned in the correspondence.

PB 18231. GERMANY. REICHSFORSCHUNGSRAT. Administrative correspondence on research projects. (ALSOS Mission, RFR 708). Dec 1943. 155 p. Price: Microfilm-$2.00 - Photostat-$11.00
This important file contains among other projects of German scientific research work in mathematics, physics, chemistry, mineralogy, etc. A complete list of actual medical research work sponsored by the Reichsforschungsrat, Germany. The medical list is compiled by Professor Sauerbruch, Berlin, and submitted by him to Professor Dr. K. Brandt, the General Commissioner in Charge of Public Health, on December 12, 1943. Most of the research projects are marked "Geheim" (Secret).

PB 22821. HARTOG, J. P. DEN. Demonstration by a German saboteur swimmer. (Naval Tech Mission in Europe Tech Rept 378-45). Sep 1945. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
This is a description of a demonstration made by one of the combat swimmers attached to the K-Verband of the German Navy in June 1945. The demonstration took place in the swimming pool of the German seaplane base at List on the island of Sylt. It included the dressing of the swimmer in woolen and rubber watertight garments and adjustment of his equipment including breathing equipment and a box of tools. A demonstration was given showing the manner in which the swimmer approached a vessel in a harbor, attached a time bomb, and then swam away under water with the aid of a luminous dial compass and watch strapped to his wrist.

PB 22828. IGNATIUS, W. R. Pressure tests of German submarine compartments, tanks, and piping. (Naval Tech Mission in Europe Tech Rept 407-45). Sep 1945. 6 p. Price: Microfilm-50¢ - Photostat-$1.00
Except for compartment air testing, general pressure testing as conducted on tanks and piping in German submarines offers little interest. To test compartments, a partial vacuum was created in the space to be tested, utilizing the ship's ventilation exhaust blower. This method which is described herein proved expeditious and entirely satisfactory. This system of compartment testing appears worthy of consideration as a time-saving feature.

PB 19447. MEISSER, O. Geophysikalische untertagemessungen für nahaufschlüsse und zur gesteinsüberwachung, Apr-Sept 1944. (Geophysical subterranean measurements for close contact control of rocks). (Reichsforschungsrat). (ALSOS Mission, RFR 507 27). Sep 1944. 2 p. Price: Microfilm-50¢ - Photostat-$1.00
A report by the Institut für Angewandte Geophysik (practical geophysics) at Freiberg (Saxonia) on experimental earthquakes caused by blastings. The reaction of the blasting on coal mines, quarries, and buildings, especially on the solidity of stones was tested with the help of a newly constructed electromagnetic instrument which may also be used for the detection of mines in small creeks. The results have been communicated to the mine-blockade command in Kiel.

PB 23091. MILTON, R. M. Scientific developments of interest for the detection of radiation by supraconductors. (U. S. Naval Tech Mission in Europe Tech Rept 557-45) Oct 1945. 39 p. Price: Microfilm - 50¢ - Photostat - $3.00
This report covers an investigation of German efforts to detect radiation by means of supraconductors of related achievements in the production and maintenance, of low temperatures, and of experimental and theoretical investigations of supraconductivity. Interrogations were made of the following subjects at the Physikalische Institut at Erlangen: (a) Friction type cooling engine, (b) Hydrogen liquifier, (c) Single expansion helium liquifier and cryostat, (d) Supraconducting investigations, (e) Midget air liquifier and (f) Short wave production with supraconductors; at the Technische Hochschule, Munich: (a) Infra-red detection with tin films and (b) Production of temperatures below 2.2°K; by interrogation of Profs. Moeglich and Rompe: Theoretical considerations on supraconductivity; by interrogation of Prof. Justi: (a) Production and properties of the nitrides of columbium, (b) Other investigations on supraconductivity, and (c) Laboratory technique and apparatus. The appendix contains three related studies in German: (1) R. Hilsch, Erlangen: Die expansion von gasen in zentrifugalfeld als kälteprozess (The expansion of gases in the centrifugal field as a refrigerating process), (2) F. Möglich and R. Rompe: "Plasmaschwingungen" als ursache der supraleitung ("Plasma oscillations" as cause for the supraconductivity) and (3) E. Justi and K. M. Koch: Supraleitfähigkeit (Supraconductivity).

PB 18270. MISCELLANEOUS correspondence of Paul Allary Produits Refractaires tne Societe Anonyme des Talcs de Luzenac, and of Hélices "Ratier". MIS VII 70 g16 7002190) Mar 1946. 28 p. Price: Microfilm-50¢ - Photostat-$2.00
This material consists of correspondence in French and German between French and German firms and German authorities in France. There is a list of 25 French iron works with statement of overdue deliveries, presumably of coal; proposal of Paul Allary, Produits Refractaires, for reopening of former metallurgical plant in the Saar district, letters from Société Anonyme des Talcs de Luzenac to Steine and Erden (German labor bureau) requesting labor for operating talc mines at Luzenac, and requests from Hélices "Ratier", Montrouge, France, for delivery of special steel to the firms Jacob Holtzer, and Davum.

PB 19609. OLBERTZ, GERTA. Rotalia, Reichsforschungsrat. (ALSOS Mission, RFR 505 49) Jul 1944. 2 p. Price: Microfilm - 50¢ - Photostat - $1.00
This short report of the Geological-Paleontological Institute and Museum of the University of Muenster in Westfalia is based on an analysis of samples of upper cretacious material which was washed in different coal mines of the Westfalian coal district. Dr. Olbertz comes to the conclusion that the classification system of the fossil Foraminifera, especially that of the rotalia, has to be revised. The different types of rotalia and their stratigraphy may be used practically in the location and drilling of petroleum.

PB 18908. OSBORNE, J. G. Robert Bosch G.m.b.H., Stuttgart, and sundry dispersal sites. (BIOS Final Rept 60, Items 22, 26) Dec 1945. 27 p. Price: Microfilm - 50¢ - Photostat - $2.00
This is the report of PB 18908 visits to various dispersal sites in Germany controlled by the Robert Bosch Company in order to investigate new developments and improved production methods in connection with fuel injection equipment applied to Diesel engines. There seemed to be little development of actual products, other than an incomplete 16 cylinder oil pump in course of development for the Junkers new jet-propelled unit, which consisted of a double bank of eight elements which were to be operated by a single cam-shaft. The Robert Bosch works at Stuttgart were totally destroyed and the offices 90% destroyed. A list of dispersal or accommodation sites, with locations, physical condition, size, activity dispersed or accommodated and personnel interviewed is given. A list of usable presses on hand and a list of products of Robert Bosch are also included in appendices. Appendix D presents information obtained on Bosch method of manufacturing metal-coated paper condensers. This section, signed by I. A. Schonborn, is in some detail and includes diagrams.

PB 22934. PRENTICE, T. MERRILL. Underground factories and storage depots in salt mines. (Naval Tech Mission in Europe Tech Rept 358-45) Sep 1945. 16 p. Price: Microfilm-50¢ - Photostat-$2.00
Descriptions of an ammunition storage depot at Dingelstedt and of aircraft factories at Westeregels and at Tarthun, all in salt mines in the Harz Mountains area southwest of Magdeburg, are given in this report. Little had been done structually to adapt these mines to their new uses, apart from the laying of concrete floors in the factories and minor cutting required for ventilating ducts. The only difficulties observed were the rather high temperatures in the mines and the risk of spoilage of parts and tools due to perspiration, the difficulty of transporting the laborers to work, the limitation of the size of the largest possibly sub-assemblies, and inflexibility of the floor space. Included are descriptions of the power, lighting, heating, ventilating and plumbing facilities. Photographs of mine shafts at the first two mines mentioned and a diagram of the ventilating system of the factory at Tarthun are also given.

PB 22806. SCANLAN, EGBERT A., JR. and HITCHCOCK, E. BENNER. Experience of fire fighting service during air raids on Hamburg. (Naval Tech Mission in Europe Tech Rept 249-45). Sep 1945. 35 p. Price: Microfilm-50¢ - Photostat-$3.00
In the course of an investigation of fire equipment tests conducted by the Hamburg Fire Department for the Reich Committee on Fire Protection, several accounts of the extensive fire damage sustained as a result of Allied air raids were heard. An article entitled, "Experience of the Fire Fighting Service during Air Raids on Hamburg", from July 24 to August 3, 1943, was obtained from Dr. Ing. Zaps, Chief of the Hamburg Fire Department. This article (in translation) makes up the body of this report. Appendix A consists of air attack data shown on a diagram obtained from the USSBS (G-2 Target Section) in London. Appendix B consists of diagrams, maps and photographs showing results of air raids and graphs of deployment of Hamburg fire fighting equipment and wind velocities. The maps may not reproduce well.

PB 22817. SCHEVILL, W. E. Wartime oceanography at the Deutsche Seewarte and the Marineobservatorium. (Naval Tech Mission in Europe Tech Rept 363-45). Sep 1945. 18 p. Price: Microfilm-50¢ - Photostat-$2.00
In general, it appears that German wartime oceanography is appreciably behind our efforts, particularly in such a field as underwater sound. This is more emphatically the case from a military point of view than from a purely scientific aspect, but applies there too. Details are given of some of the work of the Deutsche Seewarte, including projects on underwater sound, submarine indicating thermometer, electric bathythermograph, ice forecasting and wave studies. Two essentially meteorological matters are mentioned in this report as they have some oceanographic pertinence: (1) The Marineobservatorium's success in producing a fog disperser suitable for use on aircraft carriers. By heating air in petrol-burning stoves, a fog disperser was said to have been produced that was completely smokeless with no exposed flames. There is no evidence that it was tried at sea. (2) Attention is called to visibility meters designed for use at sea. The principle employed was that of a photometer. Several models were tried. Two distances were employed, one as short as possible (about 3 meters) for use on U-boats, and the other 100 meters. Neither instruments nor data on results had been located by August 6, 1945. A list of scientific institutions and civilian departments collaborating with the Marineobservatorium during the war is given which includes the Deutsche Seewarte.

PB 19438. SCHNELLER, H. Katalog und ephemeriden veränderlicher sterne (A catalogue and ephemerides of variable stars). (Reichsforschungsrat) (ALSOS Mission, RFR 507 42) Dec 1943. 1 p. Price: Microfilm-50¢--Photostat-$1.00
This report to the Reichsforschungsrat, dated Dec 10, 1943 is on the observations of the branch observatory Sonneberg in preparation for the 1945 catalogue. After critical examination a list of 85 galactic Novae has been compiled which will appear in the 1945 catalogue. The elements of the Mira stars have been revised, especially in the constellations from Andromeda to Lacerta. From 1945 on the large class of the "irregular" stars will be classified tentatively according to their photometric reaction with the surfix r = red; g = yellow and w = white. It is stated in this report that the denomination list No.42 was in preparation with 122 stars to be named.

PB 18235. SELOW, A. and others. Berechnung von gittersummen, 2. bericht, berechnung einiger summen von zylinderfunktionen (Calculation of lattice sum, 2nd report, calculation of some sums of cylindrical functions). (Institut für praktische mathematik, Technische Hochschule, Darmstadt) Oct 1944. 18 p. Price: Microfilm-50¢ - Photostat-$2.00
The study evaluates a series of lattice sums of the basic form $\sum_{n=1}^{\infty} a_n J_0(nx)$ and gives in the appendix the resulting tabulations and graphs.

PB 19272. SELWYN, JOHN. Statistics: Interrogation of Dr. Rolf Wagenführ, statistical section of the Planungsamt, Speer Armaments Ministry. (BIOS Final Rept 17, Item 28) Aug 1945. 21 p. Price: Microfilm-50¢ - Photostat-$2.00
Dr. Wagenführ listed and discussed statistics collected by the following agencies: Wirtschaftsgruppen und Reichsgruppe Industrie Ausschüsse und Ringe, Maschinelles Berichtwesen, Statistisches Reichsamt, and armament statistics of Planungsamt. He outlined methods used in planning the allocation of raw material, the place of the occupied territories in the planning of German armament requirements, manpower utilization, and the problems involved in the planning of consumer goods production. The section on manpower utilization includes discussion of statistics collected by various agencies concerned with manpower.

PB 19433. SINGER, OTTO. Oszillatorenstärken. (Oscillator strength). Reichsforschungsrat. (ALSOS Mission, RFR 507 47). Apr 1944. 1 p. Price: Microfilm-50¢ - Photostat-$1.00

This is a summary of the present status of studies conducted on "wehrmachtsauftragsnummer" (contract of the German armed forces) S 4891 - 5454 810/4 - III/43 with the subject code word and refers to examination of brightness of the third order. In German.

PB 23355. U. S. STRATEGIC BOMBING SURVEY. Economic effects of the air offensive against German cities: A detailed study of the effects of area bombing on Darmstadt, Germany. (Rept 37; Area Studies Div Rept 6) Oct 1945. 62 p. Price: Microfilm-$1.00 - Photostat-$5.00
This study was made to determine the effects of bombing on the city of Darmstadt. It presents the relative economic effects which resulted from the heavy area raid on the city and those that resulted from the precision raid directed against the industrial plants on the outskirts of the town. There was only one heavy raid of the "saturation" type with a gap of three months before the heavy raid of precision type of industry. Industrially, Darmstadt was of secondary importance, and produced less than 2/10 of one per cent of the Reich total production and only an infinitesimal amount of total war production. Major air raids over this city were unusual and did not occur until the final six months of the war. The raid of September 1944 substanially destroyed the industrial and commercial life of the city. The effects were estimated to have caused an overall production loss to the city of one month. A table of food ration cards issued from 1940 to 1945 showed the number of adults, children, and persons dependent on the community. Attack data in tabular form list the tonnage of bombs dropped. Physical damage is shown for dwellings, commercial and public buildings. Workers in various industries are listed for the years 1941-1944. Other statistics for the city are presented in graphs.

PB 23356. U. S. STRATEGIC BOMBING SURVEY. Economic effects of the air offensive against German cities: A detailed study of the effects of area bombing on Lübeck, Germany. (Rept 38; Area Studies Div Rept 7) Oct 1945. 92 p. Price: Microfilm-$1.00 - Photostat-$7.00
This report states that, as a result of the March 1942 raid, total production declined from RM 31,979,201 to RM 30,850,524, a loss of .03 months production. In the war category, the decline was indicated at about RM 2,230,000, or a loss of .12 month production; and for civilian goods there was an actual increase of about RM 900,000. Rapid recoveries were gradually achieved. Following the August 1944 raid, there was no decline whatsoever in the total production. In fact, the overall trend continued strongly upward, rising from RM 40,632,397 to RM 42,137,300 for September 1944. War goods largely reflected this rise by gaining RM 891,640. Civilian goods declined slightly to the extent of RM 132,637. The collapse that followed late in 1944 and early in 1945 is merely a reflection of the deteriorating German economy. Sections of this report give detailed data on effects of area bombing, under the following headings: I. The city as a target; II. the air offensive against the city; III. physical effects of bombing; IV. effects of raids on industrial and commercial activities; V. effect of raids on transportation and trade. Maps showing land use zones and physical damage, graphs showing production indices for the various industries from January 1941 to April 1945 and tables are included.

PB 23353. U. S. STRATEGIC BOMBING SURVEY. Economic effects of the air offensive against German cities: A detailed study of the effects of area bombing on Solingen, Germany. (Rept 35; Area Studies Div Rept 4) Oct 1945. 66 p. Price: Microfilm-$1.00 - Photostat-$5.00
Most of Solingen's industries produced the same products in wartime as in peace years, but a large part of the production contributed directly or indirectly to the war effort. Small home workshops, employing less than 10 workers each, were characteristic of Solingen, and these were less affected by the air raids because of their dispersed locations. The air raids severely curtailed production, accounting for a drop of 63 percent in value of products from the month before the raid. The loss in production during the three months following the raids of November 4-5, 1944 was equivalent to two work months in the 130 representative firms. In other words, during this period there was almost a 70 percent stoppage of output. However, in view of the fact that these raids occurred when the whole economy of the Ruhr area was on the verge of collapse, it is difficult to determine the extent to which air raids were responsible for the sharp drop in production. Sections of this report are headed, as follows: I. Summary and conclusions; II. the city as a target; III. the air offensive against the city; IV. physical effects of bombing; V. effect of raids on specific commercial and industrial activities; VI. effect of raids on industrial Solingen. Maps, tables and graphs are included.

PB 23351. U. S. STRATEGIC BOMBING SURVEY. Economic effects of the air offensive against German cities: A detailed study of the effects of area bombing on Wuppertal, Germany. (Rept 33; Area Studies Div Rept 2) Nov 1945. 138 p. Price: Microfilm-$1.50 - Photostat-$10.00
The history of 103 air attacks on Wuppertal has been studied and the damage analyzed where possible. The severe area raids on the densely built-up section of the city caused enormous damage to buildings and considerable loss of life. The number of inhabitants decreased by about 30%. Building damage was chiefly caused by fire. Incendiary bombs started conflagrations that covered 8 sq. km. destroying or heavily damaging approximately 28 percent of the total number of buildings in the city. Nearly 40 percent of the residential buildings were destroyed or heavily damaged. Industrial plant buildings were not hit so hard but industry suffered a total loss of 88 million reichmarks in inventories destroyed. Public payments for war damage exceeded 500 million reichsmarks, but this sum represents only a partial compensation for the damage sustained. The May/June area raids destroyed the center of the city, laying waste the residential and administrative sections. The physical desolation was visually impressive but misleading in its implications. The blasting of the city did not result in large scale permanent production loss to the economy of the nation nor to the industry of Wuppertal, though it did put an abrupt stop to the rapid expansion that had been taking place in the first five months of the year. There was an immediate and sharp drop in the month of the raid, still further decline in the month following, then rapid recovery within nine months to the pre-raid level. Sections of this report are headed, as follows: 1. Summary and conclusions; II. the city as a target; III. population; IV. the air offensive against the city; V. physical effects of bombing; VI. effects on life of community; VII. effects of raids on labor supply; VIII. dispersal of plants; IX. effect of raids on industrial and commercial activities; X. effects of air raids on industrial production. Maps, tables and graphs are included.

PB 23354. U. S. STRATEGIC BOMBING SURVEY. Effects of area bombing on German cities: A detailed study of the effects of area bombing on Remscheid, Germany. (Rept 36; Area Studies Div Rept 5) Oct 1945. 85 p. Price: Microfilm-$1.00 - Photostat-$6.00
It was the opinion of the Chamber of Commerce of Remscheid that as a result of the raids on the Barmen and Elberfeld areas of Wuppertal on May 30 and June 25, 1943, production in Remscheid dropped 15 to 20 percent. The drop in production, according to the sampling made, was RM 3,496,000 in June, or 18 percent below the May figure. There was a further drop of 13 percent or RM 2,159,000 in July. In addition to some direct bomb damage scored on Remscheid, a number of indirect effects were felt in Remscheid during the Wuppertal raids. Transportation facilities were disrupted and gas and electricity supplies curtailed. A great number of employees in Remscheid were absent from work, either because their homes were bombed or because of transportation difficulties. Production was therefore already depressed before the heavy area raid on July 31, 1943. This forced a further drop in production in August by RM 7,706,000 or 50 percent over July 1943. It required 10 months for the major industries to stabilize themselves at 80 percent of the average production. After the July 1943 raid, industry in Remscheid never again attained its production peak of RM 24,040,000 achieved in March 1943. The highest figure reached between the time of the raids and the complete collapse of Germany was RM 19,596,000 in June 1944. This represented 91 percent of the average. Sections of this report are headed, as follows:

I. Summary and conclusions, and The City as a target; II. The air offensive against the city; III. Physical effects of bombing; IV. Recuperation from raids; V. Effect of air attacks on industrial and commercial activities; VI. Effect of raids on industrial production. Maps, tables and graphs are included.

PB 23358. U. S. STRATEGIC BOMBING SURVEY. Final report covering air-raid protection and allied subjects in Germany. (Rept 40) Oct 1945. 281 p. Price: Microfilm-$3.00 - Photostat-$19.00
This report covers the operation of Civilian Defense forces in Germany. The primary mission of civilian defense was minimizing the effect of enemy bombingon civilian communities, industrial plants, and other installations except those of the armed forces. This report presents a study of German civilian defense organization, operation, and equipment, the manner in whichit attempted to lessen the effect of aerial attack, and the extent to which it succeeded. Figures are given for the number of sorties made, the tonnage of bombs dropped, the number of persons killed, the number seriously injured, the buildings destroyed, and the buildings severely damaged, and these figures are illustrated in a series of graphs. From a study of the operations and accomplishments of the German civilian defense services certain conclusions are drawn. These are presented with the idea of using them in planning for the improvement of such defense in the United States. The report gives the historical background for the development of German air-raid protectionservices, and describes the organization and operation of German civilian defense. In the latter section air-raid warning, control centers, air-raid wardens, fire protection and prevention, emergency medical services, rescue services, and post-raid clearance are discussed. The protections of facories, installations and public buildings is discussed in a later chapter. The training of civilian defense personnel and the training of the general public are treated briefly. Various kinds of public shelters are described and building codes for shelters are outlined. The report is illustrated by photographs. There are organization charts, and graphs. The report contains a 29 page glossary of German civilian defense terms with English equivalents. It also contains a 29 page list of abbreviations. The appendix contains notes on interrogations of Colonel Arthur Lensch, former Chief of Staff in the Air Protection Direction Staff of the German Air Force (Luftwaffe) and Colonel Ehrhard, Head of the Air Protection Direction Staff of the German Air Force High Command.

PB 23387. U. S. STRATEGIC BOMBING SURVEY. The gross national product of Germany; Kriegseilbericht; The effects of strategic bombing upon the operations of the Hermann Goering Works during World War II; Food and agriculture. (Rept 134; Special Paper 1-4) 1936-1945. 263 p. Price: Microfilm-Microfilm-$3.00 - Photostat-$18.00
This report of the Overall Economics Effects Division contains four papers relating to production in Germany. The first report on the gross national product presents the market value of the goods and services produced in the country. The gross national product in Germany, measured in current or prevailing prices, rose from 104 billion RM in 1936 to 175 billion in 1944. During the course of the war it increased 35 billion RM or 25%. Consumers' expenditures, although they were somewhat higher in money terms in 1944 than in 1936, declined during the war period. So did gross capital formation. The increasing product, declining private expenditures, and substantial contributions from foreign sources, made possible a great increase in the value of the total product available for military purposes. Data relative to gross national product and German national income are presented in tabular form. The second paper in this volume deals with production, sales, and employment of German industry, during November and December 1944 and January 1945. These statistics of German industry were collected by the "Kriegseilbericht" (War Express Report) to meet the needs of the planning section of the Speer Ministry and other war production agencies. The main part of this report is concerned with sales and employment. Production and sales for the six industry groups (raw materials; metal working industries; stones and earth; leather, textiles and clothing; food; other consumer goods) are presented in a series of tables. The data are presented in graphs. Paper number three deals with the effects of strategic bombing upon the operations of the Hermann Goering Works during World War II. This establishment was organized in 1937 as a purely German enterprise designed to put Germany on a more nearly self-sufficient basis for iron ore, coal and steel. It became a colossal combine for the exploitation of the coal and steel resources of Austria, Czechoslovakia, Poland, and France. This Goering combine became the largest single government-owned enterprise in the Reich. In 1943 it produced approximately 1/2 of the iron ore, 1/5 of the pig iron, 1/8 of the crude steel, 1/6 of the bituminous coal, and 1/10 of the lignite coal output of the entire mining and steel industry in Germany, Austria, Czechoslovakia, and Poland. The combine likewise occupied a prominent position in the production of hydrogenated oil products, tank hulls, and other munitions of war. The development of the various plants in the combine are taken up in detail and production is shown for these plants. One table gives a summary of the assets, liabilities and net worth of the principal subsidiaries in the Hermann Goering group. Sales are given for the years 1941-1944. In measuring losses incident to the bombing attacks the physical damage to the facilities are included as well as the losses of current and potential output of basic materials. Losses in steel output and pig iron are tabulated. There is a three-page bibliography, a chart showing the companies in the combine, a map showing the location of the mines, mills, and furnaces, and graphs showing production and number of workers. A table in the appendix to this report lists the subsidiaries as of December 1943 together with the work done by each, the capital and the amount of participation. The appendix also contains monthly production statistics for the years 1941-1943. The fourth report in this volume is concerned with food and agriculture. The achievement of virtual self-sufficiency in food was an important phase of the war production of the Third Reich. She so nearly achieved this that during the last prewar year her dependence upon food imports had been reduced to 11% of the total food consumption calculated in calories. Germany's standard of nutrition has always been lower than that of other countries with a similar level of national income. Approximately 30% of the total per capita consumption was derived from animal foods as compared with 40% in Great Britain. As the war progressed Germany became more vegeterian. Deterioration in the food ration was inevitable during the general economic collapse which began late in 1944 but domestic harvests and the total available supplies of food were consistently above the last war. It was somewhat difficult to determine the actual damage to food production as a result of bombing raids but since the German harvest was not the object of air attack there is no evidence worth mentioning of damage at the farm level. Some damage was done at the processing level but not enough to constitute any real threat to the food supply as a whole. There was also some damage to food stocks. There is a one-page bibliography. Tables show the amount of agricultural land, import of food products, changes in food rations, per capita consumption in calories 1939-1944, weekly ration of flour, meat and fat in Germany 1915-1918 and 1939-1943, consumption and supply of bread grains, livestock in Germany, supply and consumption of meat, supply and consumption of fats, supply and consumption of sugar, fertiliser consumption.

PB 23343. U. S. STRATEGIC BOMBING SURVEY. Overall report (European War). (Rept 2) Sep 1945. 110 p. Available from the Supt. of Docs., Washington 25, D. C. price: 50¢
The Bombing Survey was set up to make an impartial and expert study of the effects of aerial attack on Germany. The information was obtained from three main sources: First, close examination and inspection of several hundred plants, cities, and areas; second, masses of statistical and other material, ranging from records of individual companies and cities to top German government documents; third, interrogations and interviews of thousands of Germans including military and political leaders. This report summarizes the general survey. It shows how German air power was attacked. It discusses the effects of attacks on selected industrial target systems--the attacks on oil, rubber, chemicals, powder and explosives, on transportation, the motor vehicle industry, the tank industry, the submarine industry. It discusses the attack on the steel industry, ordnance, electric utilities, machine tool industry. One section summarizes the physical damage from bombing, another

discusses German civilian morale, and German civilian defense. Statistics relative to the damage done by bombing attacks on Germany are presented in graphs. Such graphs include: Tons of bombs dropped; bomber sorties; fighter sorties; claimed enemy aircraft destroyed and probably destroyed; bomber planes lost; fighter planes lost; personnel lost in action; bomber planes assigned to combat units; fighter planes assigned to combat units, and personnel assigned to combat units. There are also graphs showing production figures. The end papers contain a map of western Europe with hundred mile concentric circles centering at Foggia and Mildenhall.

PB 23381. U. S. STRATEGIC BOMBING SURVEY. Synthetic oil plant and nitrogen plant, Gewerkschaft Victor, Castrop-Rauxel, Germany. Vols I-II. (Rept 122; Plant Rept 12; Oil Plant Rept 9) 1945. 398 p. Price: Microfilm-$4.00 - Photostat-$27.00

This report in two volumes covers United States strategic bombing survey of damage done to the Victor Corporation synthetic oil and nitrogen plants located in the Ruhr three miles north of Castrop-Rauxel and seven and one half miles north of Dortmund. The oil plant is one of the smaller synthetic plants using the Fischer-Tropsch process with an annual production of 40,000 tons. The nitrogen plant had a capacity of about 5,700 metric tons per month. The two plants cover an area of 91.09 acres roughly in the shape of a parallelogram. The Victor Corporation plants was the designated target in eight raids by the Royal Air Force and one raid by the United States Strategic Air Force. After Sept 11, 1944 raid by the Royal Air Force, the synthetic oil plant did not resume production and the major raids on Nov 11 and 21, 1944 caused all attempts at reconstruction of the nitrogen plant to be abandoned. Volume one describes the plant and its function in enemy economy, including data on equipment and processes, attacks, effect of bombing, recuperability cycle, target vulnerability, intelligence check, and evaluation and impressions, with plant data, layouts and production charts given in an appendix of exhibits. Volume II continues appendix of exhibits including descriptions of air raid shelter and protective installations, reports of interrogations of officials, drawings, charts of production, flow sheets of nitrogen plant, Fischer-Tropsch plant, hydrogen production, and nitrogen and ammonia production; and photographs showing actual damage to various parts of both plants.

PB 23359. U. S. STRATEGIC BOMBING SURVEY. Target report of Civilian Defense Division Field Team No. 82, covering air-raid protection facilities and allied subjects in the city of Hamburg, Germany. Vols I and II. (Rept 44; Civilian Defense Rept 4) Oct 1945. 519 p. Price: Microfilm-$5.50 - Photostat-$35.00

These two volumes contain a detailed study of civilian defense and air-raid protection in the City of Hamburg, Germany during World War II. Volume I contains the text of the report arranged under six headings, I., The introduction, gives general statistical data regarding the size, population of the city, casualties, dates of bombing, etc. II. Organization and operation of German civilian defense including air-raid warning facilities, the functions and operation of control centers, organization of air-raid wardens, incident control, fire protection and prevention, emergency medical services, rescue, emergency welfare, post-raid clearance, repair and restoration, war damage claims, protection of factories, installations and buildings devoted to public use, extended self-protection of the Hamburg school system and of other organizations, railroad air-raid protection, national post office (communications) air-raid protection and port security, mobile reserves, and unexploded bombs. III. Passive defense installations and precautions, including protective lighting, shelters, gas protection, camouflage and movement during air-raids and protective measures taken by the public. IV. Evacuation; V. Selection and training of civilian defense personnel. VI. Informing and training of the general public. Volume II consists of photographs, tabulated statistics, organization charts, maps for plotting courses of planes, forms for making reports, reports of inspections of extended self-protection services of various organizations, data on public shelters, evacuation of school children, reports of interviews with leaders in civilian defense activities, list of courses given at the Industrial Air-Raid Protection School, and much other information relative to the information given in Volume I.

PB 23342. U. S. STRATEGIC BOMBING SURVEY. The United States strategic bombing survey: Summary report (European War). (Rept 1) Sep 1945. 19 p. Price: Microfilm-50¢ - Photostat-$2.00

The United States Strategic Bombing Survey, established in November 1944, made a close examination and inspection of several hundred German plants, cities and areas, amassed volumes of statistical and documentary material, and conducted interviews and interrogations of thousands of Germans, including virtually all surviving political and military leaders. Some 200 detailed reports were made, including an Over-all Report, of which this is a summary. The phases of the air war against Germany and its results are discussed.

PB 19526. U. S. WAR DEPARTMENT. MILITARY INTELLIGENCE DIVISION. Company officer's handbook of the German army. (Special Series 22) Mar 1944. 138 p. Price: Microfilm-$1.50 - Photostat-$10.00

German offensive principles and general defensive principles are described, illustrated by diagrams. Weapons, obstacles and vehicles, organization data and military symbols are discussed. Photographs and organization charts are included.

PB 19528. U. S. WAR DEPARTMENT. MILITARY INTELLIGENCE DIVISION. German mountain troops. (Special Series 28) Dec 1944. 183 p. Price: Microfilm - $2.00. Photostat - $13.00

This book contains sections on uniforms and insignia, training, mountain walking, rock and ice climbing, communication, evacuation, supply, prepared routes, aerial tramways, bridging supply by air, shelter, and mountain troops in winter. Eastern front map shows average January temperatures compared with those of U. S. cities. A second map shows a typical winter position along a river in Finnish Karelia, indicating position of trenches, gun emplacements, etc. Photographs of uniforms and equipment are included.

PB 19530. U. S. WAR DEPARTMENT. MILITARY INTELLIGENCE DIVISION. German ski training and tactics. (Special Series 20) Jan 1944. 114 p. Price: Microfilm-$1.50 - Photostat - $8.00

This work is an edited translation of a German manual entitled "Tentative instructions for the training and tactics of ski troops" (Vorläufige richtlinien für ausbildung und kampf von skitruppen), based on the experiences of the German forces on the Eastern Front and on lessons learned from the Finnish Army. Chapters are devoted to individual training; unit training; heavy infantry weapons; marches on skis; patrols, assault troops, and raiding parties. Appendices cover organization of ski company and battalion; towing, snowshoeing and dog teams; maintenance of skis and sleds; means of evacuating wounded; and individual and unit identification.

PB 17370. WAGGONFABRIK TALBOT, AACHEN. Patentvergütungen (Employee inventions). (MIS VII 68b 16 7001036). n. d. 61 p. Price: Microfilm-$1.00 - Photostat-$8.00

This report consists of correspondence between the Waggonfabrik Talbot in Aachen and its patent attorney, Dr. Kemnade in Wuppertal-Barmen. The question at issue is whether the OKH (High Command of the Army) or the Waggonfabrik Talbot is to pay the fees for secret patents on inventions made by employees of the firm in compliance with an Army contract. The original OKH contract is included in the correspondence; the letter of September 25, 1942, however, in which the inventions are mentioned, is missing.

PB 18236. WALTER, A. and SCHÖBE, W. Weitere gittersummen von funktionswerten der Hankelfunktion (5.bericht zu "berechnung von gittersummen") (Calculation of lattice sums, 5th report, additional lattice sums of functional values of Hankel-functions). (Institut für praktische mathematik, Technische Hochschule Darmstadt). Dec 1944. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
This is a calculation of the values of the lattice sum

$$S(d,a)=\sum_{n=-\infty}^{+\infty} H_0^2\left[2d+(2n+1)a\right] \quad \text{for} \quad \pi<a<2\pi$$

and shows the real and imaginary curves resulting from the dependency of d with a as the parameter. Will produce poorly. In German.

PB 18237. WALTHER, A. and SCHÖBE, W. Berechnung von gittersummen, 4.bericht: Auswertung trigonometrischer gittersummen (Computation of lattice sums. 4th report: Evaluation of trigonometric lattice sums). Institut für praktische mathematik, Technische Hochschule Darmstadt. Nov 1944. 16 p. Price: Microfilm-50¢ - Photostat-$2.00
Upon request of the German navy the following lattice sums were computed and evaluated:

$$F_1(d,s)=\sum_{n=-\infty}^{+\infty}\frac{\cos(nd-s)}{(nd-s)}$$

$$F_2(d,s)=\sum_{n=-\infty}^{+\infty}\frac{\sin(nd-s)}{(nd-s)^2}$$

$$F_3(d,s)=\sum_{n=-\infty}^{+\infty}\frac{\cos(nd-s)}{(nd-s)^3}$$

with $0<\frac{s}{d}\leq\frac{1}{2}$ and $0<d<4\pi$

The computed values are presented in tabular and graphical form.

Japanese

PB 22169. DIEHL, F. L. Japanese equipment and information. (CWS Tech Div Memo Rept 478) Nov 1942. 33 p. Price: Microfilm-50¢ - Photostat-$3.00
Japanese equipment described in this report included: (1) Army supplementary food ration, vitamin B; (2) bleaching powder pouch; (3) decontamination package; (4) water purification kit; (5) leather preservative (grease); (6) creosote balls (pills). The army supplementary food ration is intended for consumption by the soldier to safeguard against vitamin B deficiency diseases, particularly beriberi, as may occur on a diet of white rice. No tests were made to determine the composition of the supplementary food. The bleaching powder pouch and the decontamination package were stated to have been taken from a Japanese gas mask carrier. The bleaching powder pouch is a rubberized fabric pouch which is judged to be made of silk coated with a Buna S type synthetic rubber, and is designed to hold approximately 125 g. (4.4 oz.) of agent. The decontamination package consists of a can of decontamination powder and a roll of absorbent cotton both contained in a cloth bag. The contents of the can are wetted and applied to the skin of the individual with the cotton wherever there is contamination. The decontaminating agent has been identified as sodium beta-naphthalene sulfonchloramide, 17.8%, and 82.2% clay. The active chlorine is 2.66% based on the bone-dry agent. The active agent is apparently rather stable as no corrosion on the metal can was evident. The chlorinating agent of the water purification kit is composed of a mixture of calcium and sodium hypochlorites. The neutralising agent to destroy the chlorine is sodium thiosulfate. The leather preservative has not positively been identified as to composition because of insufficient sample. It is thought, however, to be a mixture of neats' foot oil and vegetable wax. The leather preservative furnishes protection against liquid mustard for 379 minutes when incorporated into leather. The creosote balls (pills) are believed to be intended for use in the treatment of malaria. Appendix A contains photographs of equipment with detailed descriptions. Appendix B contains laboratory analyses of decontaminating agent, water purifying agent (possibly bleach), neutralising agent (possibly $Na_2S_2O_3$), and leather grease.

PB 19537. U. S. WAR DEPARTMENT. MILITARY INTELLIGENCE DIVISION. Japanese Parachute troops. (Special Series 32) Jul 1945. 67 p. Price: Microfilm - $1.00 - Photostat - $5.00
This book contains chapters on training, organization of army and naval paratroop units, tactics of Japanese paratroops, planes and parachutes, Japanese paratroopers weapons, and individual outfitting and rations. Photographs and diagrams are included.

PB 19531. U. S. WAR DEPARTMENT. MILITARY INTELLIGENCE DIVISION. Soldier's guide to the Japanese army. (Special Series 27) Nov 1944. 187 p. Price: Microfilm - $2.00 - Photostat - $13.00
This guide contains sections on the entrances of the Japanese males into the army, characteristics and training, uniforms, equipment, infantry weapons, artillery and armored materiel. A chapter is devoted to the organization of the Japanese army, and another to the tactics of the Japanese army in action. Photographs and diagrams are included.

United States

PB 22549. ABRAMS, M. H. and others. Collected informal communications on the basic audibility of English words for use as oral codes, alphabetic equivalents, etc. (OSRD Rept 1571; NDRC Rept 17.3:21; NDRC Res on Sound Control Informal Communication 17, 20, 23-25, 29, 32) Jul 1943. 166 p. Price: Microfilm-$2.00 - Photostat-$12.00
The purpose of the studies reported herein was to measure and compare the intelligibility of words used to identify the letters of the alphabet. Tests were made concerning the intelligibility of the alphabetical equivalents: (1) in the lists known as "USA," "BAAF," "Royal Navy," "British Army"; (2) in the lists known as "Proposed London," "Suggested U. S.-British," "Other Words Discussed"; (3) in the commercial lists employed by "American Telephone and Telegraph," "Bell Telephone of New Jersey," "RCA Communications," "Western Union," "International Telecommunications Convention"; (4) in lists prepared by the Psycho-Acoustic Laboratory at Harvard University. The method of testing the intelligibility of these words is described and the scores are given in the first preliminary communication. The titles of the remaining communications which contain much detailed information on this subject are as follows: (2) the comparative intelligibility of alphabetic equivalents in the LCC (Proposed London), USA and NDRC (Harvard) lists; (3) The comparative intelligibility of alternative pronunciations of the numerals "0" through "9"; (4) instructions for communication operators; (5) intelligibility of "telephone directory names for unit headquarters"; (6) a vocabulary of highly intelligible words for military communication in noise; and (7) a vocabulary of tactical call signs for communication in noise. This report was prepared by the Psycho-Acoustic Laboratory at Harvard University.

PB 23208. BEMFORD, ROBERT J. and others. The technique for testing oxygen masks. (OSRD Rept 117) Jul 1941. 13 p. Price: Microfilm-50¢ - Photostat-$1.00
This material presenting the general principles to be observed in the construction and testing of masks for oxygen inhalation in aviation, together with remarks upon mask suspension and resistance to breathing, is part of a major report on the development of oxygen masks (PB 23204). The appendix gives descriptive details upon the quality

of the rubber that should be used in the mask. This work was done under contracts between the Harvard School of Public Health and the National Defense Research Committee.

PB 23513. BROWN, JOHN P. The stability of compressible flows and transition through the speed of sound. (AAF ATSC Tech Rept 5410) Jan 1946. 73 p. Price: Microfilm-$1.00 - Photostat-$5.00
This report is a theoretical investigation of the stability of steady compressible flows, particularly at a 'transition line' where the fluid velocity equals the speed of sound. The differences between supersonic and subsonic flow are explained, and the known flows containing both supersonic and subsonic regions are described. It has been conjectured that any steady transition from supersonic to subsonic flow is unstable. The present report is an investigation of the validity of this conjecture. Physical proofs of the conjecture are given for the case of flow in a nozzle, followed by a mathematical analysis based on the approximate equations for unsteady flow. A satisfactory proof for instability of a transition in decelerated nozzle flow is obtained, and strong indications are found that a transition in accelerated flow is stable. Diagrams illustrating various flows, mathematical equations, and a bibliography, accompany the theoretical discussion.

PB 18626. BYRNE, ANNE F. and others. Gas mask disinfection. (CWS Medical Div Rept 64). Jan 1946. 17 p. Price: Microfilm-50¢ - Photostat-$2.00
The objects of the experiments were: (1) to test the ability of gas mask disinfectant MI to disinfect gas masks contaminated with nonspore-forming and spore-forming bacteria and mycobacterium tuberculosis; (2) to develop a practical method for disinfecting gas masks using gas mask disinfectant MI; and (3) to test the disinfecting ability of the new gas mask disinfectant Hyamine 1622. Results of the experiment show the gas mask disinfectant MI inadequate, but Hyamine 1622 proved effective in killing the test organism when used according to the Field Manual technic for disinfecting gas masks.

PB 22846. CAYWOOD, T. E. and EKRANEK, L. L. Acoustical considerations in the design of an oxygen mask. (OSRD Rept 952) Oct 1942. 33 p. Price: Microfilm-50¢ - Photostat-$3.00
The data presented in this report were studied to determine the factors which contribute toward better intelligibility in communication systems in aircraft when oxygen masks are used. In addition to the prime purpose of supplying oxygen to the wearer, the mask must also serve the incidental purpose of housing a microphone so that the wearer may communicate with others in the airplane in the presence of high noise levels. It has been found that certain oxygen mask and microphone combinations yield better intelligibility than others and the purpose of this investigation was to make clear the reasons for these differences and to suggest ways of designing new masks which would improve communication. Experiments on a simplified 'mask' and on military oxygen masks are described and the results discussed. Among the conclusions are the following: (1) The cavity of air enclosed by the mask should be as small as possible. Openings around the sides of the face and under the chin should be reduced to a minimum volume; (2) if the volume of enclosed air is not large, the microphone should be located as far from the lips as is possible and in a central position on the inner surface of the mask; and (3) the response of the mask should be tailored to complement that of the microphone (or vice versa) such that the overall voltage-frequency response is 'flat'. Modifications of the U. S. Army A-9 mask and the Navy M. S. A. mask are described. These modifications were not intended to be practical, but rather to show the principles involved and to aid in the design of an oxygen mask having ideal acoustical features. A study was made of three British masks, in all of which it was found that the response curve was superior to that found for the A-9 mask. Photographs and drawings of the United States and British masks and plotted curves showing response in decibels and frequency in cycles per second of the various masks tested are included in this report prepared at Cruft Laboratory at Harvard University.

PB 23204. DRINKER, C. K. and others. An account of the construction and efficiency of mask L-12 for oxygen inhalation in military aviation. (OSRD Rept 130) Aug 1941. 91 p. Price: Microfilm-$1.00 - Photostat-$7.00
This report describes a new oxygen mask developed by Dr. Drinker at Harvard University under contract with the National Defense Research Committee. Part I discusses general principles to be observed in the construction and testing of masks for oxygen inhalation in aviation together with remarks upon mask suspension and resistance to breathing. The appendix to this section presents descriptive details upon the quality of the rubber that should be used in the mask. Part II contains a description of mask L12 with a discussion of the ways in which the construction of the mask meets the requirements given in Part I. Part III describes technique and results of tests for leakage about margins of mask L12 in final form with shield in place. Part IV describes the performance of mask L12 in the low-pressure chamber under conditions of rest and work which averaged 1300 foot pounds per minute. Part V gives the performance of mask L12 in low temperatures with winds from 6-13 miles per hour blowing directly upon the face. Part VI contains appraisal of mask L12. The appendix presents a description of a rapid method for planning and construction of a molded rubber mask such as L12, by Frank W. Maurer. Tables and photographs are included.

PB 23206. DRINKER, C. K., and others. The construction of mask L-12 for oxygen inhalation in military aviation: Final report. (OSRD Rept 335) Jan 1942. 14 p. Price: Microfilm-50¢ - Photostat-$1.00
This report deals with a final period of work extending between Nov 10, 1940 and Jan 1, 1942. It describes the final version of the L-12 mask now being manufactured in quantity for the Army under the designation A-9. The mask combines the advantages of good fit and safety at high altitudes with an unusual ability to operate for considerable periods of time at very low temperature. This concludes the development of this type of mask under contracts between the Harvard School of Public Health and the National Defense Research Committee. Photographs are included. Earlier progress reports are given in PB 23203-PB 23205.

PB 23205. DRINKER, C. K. and others. Examination of three masks employed for oxygen inhalation in military aviation. (OSRD Rept 164) Nov 1941. 49 p. Price: Microfilm-50¢ - Photostat-$4.00
The first section of this report dealing with the principles of mask design and testing appeared in the previous Division B reports serial 55, OSRD Rept 117 (PB 23203) and serial 68, OSRD Rept 130 (PB 23204), but is here reproduced for convenient reference in connection with Part III. The material in this report was obtained as a result of experiments which were necessary and preliminary to the development of an improved type of oxygen mask under contracts between the Harvard School of Public Health and the National Defense Research Committee. Tables and photographs are included. After a description of the method for testing points of mask leakage and volume of leakage under different conditions, the efficiency of three masks used in military aviation is discussed.

PB 22848. EGAN, J. P. Articulation testing methods II. (OSRD Rept 3802; NDRC Rept 17.3:138) Nov 1944. 95 p. Price: Microfilm-$1.00 - Photostat-$7.00
There are many reasons why oral communication may be inefficient or fail completely. Distortion of speech sounds by inferior transducers, masking of these sounds by ambient or electrical noises, improper use of microphones and headsets by communications operators, all conspire to make communication uncertain and unreliable. This report presents a description of some of the methods found useful at the Harvard Psycho-Acoustic Laboratory for evaluating the relative importance of those factors which influence the intelligibility of speech. Its purpose is also to make available to other

laboratories engaged in research on communication the lists of syllables, words, and sentences constructed and extensively used at this laboratory. To the extent that these test materials represent an improvement over those contained in an earlier discussion of articulation testing methods (OSRD Report 383, Feb 1, 1942), this report may be regarded as superseding the earlier account. This report describes methods of conducting articulation tests. In the typical method an announcer reads lists of syllables, words, or sentences to a group of listeners and the percentage of items correctly recorded by these listeners is the articulation score. It must be remembered that all articulation scores are relative scores, contingent upon the use of specific announcers, microphones, amplifiers, earphones, noises, listeners and test lists. Tables and graphs of data are included. Appendices contain syllable and word lists.

PB 23171. FAIRCHILD, JACKSON K. Use of the industrial mobilization plan in World War II. Aug 1945. 34 p. Price: Microfilm-50¢ - Photostat-$3.00
This report consists of a talk on the industrial mobilization plan of the Signal Corps and its use in World War II, given by the Chief of the Evaluation Branch, Control Division, Signal Corps, on June 29, 1945, at The Army Industrial College. Remarks on the application of the industrial mobilization plan in the Chicago Ordnance District, by Brigadier General Donald Armstrong, Commandant, The Army Industrial College, are also included. A chart and tables illustrating Signal Corps Production form part of the report.

PB 22482. HARTLINE, H. K. Problems of visual physiology during the war. n. d. 6 p. Price: Microfilm-50¢ - Photostat-$1.00
The importance of vision in all kinds of military operations made it inevitable that during the war a great deal of attention was directed toward the investigation of visual problems. The author, who is associated with the Johnson Research Foundation of the University of Pennsylvania, has selected a few examples to show the character of some of the investigations that are of particular interest to physiologists. The examples selected are all concerned with night vision, which becomes suddenly of vital importance in war time, when artificial lights dare not be used freely, and both sides take advantage of the cover of darkness. One of the first problems considered was that of the selection of personnel on the basis of their sensitivity to light, after complete dark adaptation. Mass testing was not reliable; individual testing was too time consuming and required skilled operators. The Canadians were able to utilize individual testing, and the United States Navy ultimately adopted individual testing procedures. Early in the investigation of the military problems of night vision it became apparent that while selection was of dubious value, training in night vision offered great promise. The importance of night vision drew attention to many very practical problems of protecting the night visual capacities of personnel. Among these is the problem of the illumination of vehicles, ships, and aircraft for operation at night, which is discussed at some length. The U. S. Navy used red illumination for lighting of ships and aircraft at night, particularly for lighting of interiors and for illumination of instruments.

PB 22049. HICKS, J. S. Decontamination of fire control apparatus. (CWS Tech Div Memo Rept 649) May 1943. 33 p. Price: Microfilm-50¢ - Photostat-$3.00
A Signal Corps radio apparatus SCR-268 was set up for a field test, contaminated with an airplane spray of mustard gas while operating and then successfully decontaminated. Appendix A contains a Tentative Technical Manual, dated Apr 26, 1943, on this decontamination, while Appendix B contains photographs.

PB 23772. IVES, HERBERT E. and others. Report of the Committee on Illumination, National Research Council. (OSRD Rept 243) Oct 1941. 25 p. Price: Microfilm-50¢ - Photostat-$2.00
Chief attention is given in this report to the major problems presented to the committee for study: First, the problem of landing aircraft at night in such a way as not to reveal the landing operation to an enemy; and second, the operation of Army vehicles of all types at night in such a way as to avoid detection by the enemy either upon the ground or in the air. Airplane landings on a field at night and the landing of naval aircraft carriers in the dusk or at night, and the following devices for use in conjunction with military vehicles are discussed: Shielded head-lamps, vehicle marker lights, road markers, and the use of invisible radiations, including infrared and ultraviolet radiation. In addition to the foregoing, the committee was in consultation with military officers on a number of other problems on which specific requests for investigation may later be made. Among these may be listed: 1. The use of infrared and ultraviolet radiations in connection with secret surveying operations for the production of military maps in enemy territory; 2. the use of the infrared and ultraviolet illuminating schemes in connection with wartime railway operations; 3. the use of special kinds of phosphorescent materials in the detection of infrared radiation, as a substitute for the electron image tube; 4. the use of illumination to confuse enemy observers, particularly as a protection of bombers from pursuit airplanes; 5. design and method of use of indicating devices for blackout traffic direction officers; 6. selectively absorbing smoke screens for use with infrared image tube.

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PB 22847. KAHLIN, J. E. and others. Auditory tests of the ability to hear speech in noise. (OSRD Rept 3516; NDRC Rept 17.3:104) Sep 1944. 78 p. Price: Microfilm-$1.00 - Photostat-$6.00
Previous investigations have shown that individuals differ widely in their ability to understand messages spoken over military communication systems in the presence of interfering noise. In order to provide tests for measuring this ability different types of speech material against a background of masking noise were recorded at the Harvard Psycho-Acoustic Laboratory. These tests, available on phonograph discs and suitable for group administration, were designed to be most efficient when administered over resonant earphones (TH-37 or H-14), but they have also proved to be of adequate reliability when played over a loudspeaker or over non-resonant earphones (ANB-H-1). An analysis of the listening tests and a description of methods used in recording the tests are given. Appendix A consists of manuals of instructions for auditory tests, and Appendix B of a note on the multiple-choice word test. Photographs, diagrams and tables are included.

PB 22468. MAUREN, FRANK W. Development of a full-face oxygen mask incorporating ventilated fog-proof lenses: Progress report. (OSRD Rept 3164) Jan 1944. 57 p. Price: Microfilm-$1.00 - Photostat-$4.00
This report describes the development of a full-face oxygen mask, incorporating fog-proof lenses, so that vision would be unobstructed by fog or frost at sub-zero temperatures. The theories upon which the development was based were incorporated in a rough experimental model. The results of trials with this rough model guided the design and construction of the first molded model as well as the design and construction of special lenses. The principles upon which this development is based may be listed as follows: (1) Separation of the mask into two compartments -- the eye compartment and the oro-nasal compartment; (2) controlled one-way ventilation of the eye compartment by the inhaled air of the wearer for the removal of water vapor formed by the eyes and surrounding skin, which vapor would, by saturating the air over the eyes cause lense fog; (3) exclusion of the saturated exhaled air from the eye compartment where the added water vapor arising from the lungs would intensify the formation of lens fog, the exclusion being accomplished by a valved connection between the eye and oro-nasal compartments as well as by a nasal sealing ridge built into a mask between the two compartments; (4) the use of a double plastic lens, embodying an air-cell 0.060" thick, by means of which the outer and inner surfaces of the lenses are effectively insulated

from one another, thus greatly reducing the loss of heat from the eye compartment as well as the transmission of cold from the outside air; (5) the use of an absorbent coating on the surface of the lens nearest the eye to prevent the formation of intermittent fog during the exhalation period when at temperatures lower than -30° F.;(6) the elimination of external clamps used for sealing the lenses in the mask, by making use of the elasticity of the rubber as well as building into the eyepieces flexible metal beads to prevent the accidental removal of the lenses; and (7) the shielding of the exhalation valve after the manner of the A-10 series of oxygen masks to prevent freezing of the expiratory valve. The NDRC contract under which this work was done at Harvard University was extended in order that certain requests of the Aero Medical Oxygen Unit could be incorporated into the mask in an attempt to make it ready for use by waist gunners, fighter pilots, and ground crews operating in frigid climates. See OSRD report 4584(PB 22476) for alterations to this mask. Photographs and drawings illustrate the report.

PB 22476. MAURER, FRANK W. Full head coverage oxygen mask incorporating ventilated fog-proof lenses. (OSRD Rept 4584) Jan 1945. 16 p. Price: Microfilm-50¢ - Photostat-$2.00
This report describes the alterations that have been made on the full-face oxygen mask. (See OSRD report 3164 (PB 22468) for development of earlier mask). Lenses were increased in diameter from 2 1/16 inches to 2 10/16 inches. Lens clamps were developed and mask measurements were altered to bring the facepiece within size ranges set up by the Aeromedical Laboratory. The original facepiece was made to meet specifications for medium size. Large and small sizes were constructed according to the measurements provided by the Aeromedical Laboratory. The location of the microphone lead-in port plug was altered. The shield over the exhalation valve was molded integrally with the facepiece. Photographs illustrate the report which was prepared at Harvard University.

PB 21129. O'BRIEN, MORROUGH P. The removal of oil from harbor waters by means of chemically treated sand: Final report, Nov 30, 1942. (OSRD Rept 1120). Jan 1943. 112 p. Price: Microfilm-$1.50 - Photostat-$8.00
This study of the removal of oils from harbor waters by the use of chemically treated sand provides the necessary technical information on the basis of which the practicability of the method for various possible applications may be judged. It has been found that a 1000-bbl. spill of gasoline covering an area of 337,000 square feet may be reduced from a film thickness of 0.20 to 0.05 inches by spreading 317 tons of 0.003-in. sand doped with 2.7 tons of Armour amine acetate. The cost of the chemical is in the vicinity of $1,500. The oil is retained by the sand which sinks to the bottom of the harbor. The experiments described in the report are believed to provide a sufficient basis for preliminary development of methods and estimates for full scale sinking of oil films with doped sands and no further laboratory work appears justified. Tables, graphs and diagrams appear in the text. Photographs are included.

PB 6952. RANDALL, FRANCIS E. Coordination of winter helmets with head size and flying equipment. (AAF ATSC Mem Rept ENG-M-49-695-19A) Dec 1942. 9 p. Price: Microfilm-50¢ - Photostat-$1.00
Four sizes of winter shearling helmets were tested for distribution of sizes, location of ear sockets, and coordination with goggles and oxygen masks. Tests showed that the range of sizing specifications is satisfactory to accomodate Army Air Forces personnel. However, in every ten helmets produced according to specifications, one set of ear sockets should be left unmounted to allow for individual variations. Appendix I shows the distribution of head circumferences and sizes accomodated. Photographs.

PB 23538. REGENER, ERICH. The structure and composition of the stratosphere. (AAF ATSC T-2 Translation 509) Jan 1946. 31 p. Price: Microfilm-50¢ - Photostat-$3.00
This is a translation of a captured German document, evidently an address by the author, in which he gives a synopsis of the principal problems involved in a study of the stratosphere. He considers questions regarding the composition and the condition of the air strata below and above 30 kilometers and gives meteorological facts concerning the stratosphere from observations made at high altitudes. Among the topics discussed are the various factors determining the condition of the air at high altitude; segregation of the air; the effect of turbulence; intermixing of the atmosphere by vertical movements; the ozone content of the atmosphere and its influence; the absorption of solar radiation by the ozone stratum; the measurement of the altitude and temperature of the ozone stratum; the temperature of the atmosphere above the ozone stratum, 45 km - 85 km; a new temperature rise above 80 km; and information obtained on the higher strata from studies made by various scientists on the aurora borealis. There was considerable discussion of this paper by the audience. The paper is accompanied by graphs showing percentage composition of the atmosphere to 300 km; pressure reduction with altitude for an atmosphere of pure nitrogen, pure oxygen and pure helium; temperature course up to 35 km altitude; reduction of oxygen content of atmosphere during segregation above 10 km altitude; and thickness of ozone stratum in various geographical latitudes. Photographs and drawings of apparatus, and a diagram of the aurora borealis rays within and outside of the earth's shadow are included.

PB 20683. ROCKWELL, P. O. Development of a canister for submarine service. (Edgewood Arsenal Chemical Div Rept 224) Nov 1922. 24 p. Price: Microfilm-50¢ - Photostat-$2.00
This report describes the development of a canister to be used on a submarine gas mask which meets the following requirements: (1) Satisfactory protection is afforded against chlorine, acid vapors, carbon monoxide, oil vapors, and smoke; (2) the resistance to breathing is low; and (3) the canister is small and of light weight so that it can be attached directly to a face piece. Protection is afforded by the following filling: Hopcalite, charcoal, pumice impregnated with sodium hydroxide. The canister is so designed that it may be used repeatedly by replacing the impregnated pumice and charcoal and drying the Hopcalite. A diagram of the canister is enclosed as are graphs, showing the results of tests.

PB 20632. ROCKWELL, P. O. Specifications for the fireman's, all purpose, canister. (Edgewood Arsenal Chemical Div Rept 256) Apr 1923. 9 p. Price: Microfilm-50¢ - Photostat-$1.00
A canister giving protection against carbon monoxide, ammonia, organic vapors, acid gases, and industrial smokes has been developed. The specifications are given for this "all purpose" canister. If protection is needed against only one or two types of compounds than a canister filled with absorbents particular to these gases should be used instead of an "all-purpose" canister. The pressure drop across the "all-purpose" canister is 50 mm. of water at a flow of 85 liters per minute. A diagram of the canister is attached.

PB 22849. SHAW, W. A. Development of ear wardens type V-51R. (OSRD Rept 5122; NDRC Rept 17.3:173) Jul 1945. 72 p. Price: Microfilm-$1.00 - Photostat-$6.00
This report from the Harvard Psycho-Acoustic Laboratory states that protection of the ear against the effects of loud noise may be accomplished in at least three ways. The source of the noise may be isolated by appropriate means, the surroundings may be acoustically treated in such a fashion as to reduce the intensity of the noise, or the ears themselves may be stopped against the sound. This third method is the one most applicable in the usual military situation, and for this purpose the development of a satisfactory earplug was undertaken. This earplug was designed to meet three classes of requirements: (a) Comfort over long periods of continuous wear; (b) high acoustic insulation over a range of audio frequencies extending from 0 to about 10,000 cps; and (c) approximately uniform acoustic insulation over the range of audio frequencies. Uniform insulation is desirable for maintain-

ing distortionless transmission of speech frequencies at reduced intensities. In the course of its developmental work, the laboratory has had occasion to evaluate commercial earplugs of various types, and to consider some industrial applications of the ear warden. These incidental observations, undertaken at the request of the Bureau of Medicine and Surgery, USN, and the Army Air Force are reported in the appendices. Photographs, graphs, drawings and a bibliography of reports on earplugs are also included.

PB 5324. SHATERSON, M. W. Tests conducted to determine methods of obtaining flash performance of aircraft engines at high altitudes. (AAF ATSC Memo Rept EXP-M-57-531-122) Jan 1942. 10 p. Price: Microfilm - 50¢ - Photostat - $1.00

The purpose of this memorandum is to report results of tests conducted to date on the problem of obtaining flash performance of aircraft engines at high altitude by oxygen enrichment of intake air and by the use of supplementary gaseous fuels. This is a continuation of the work outlined in memorandum report EXP-M-57-531-111. The various tests are described in details and results obtained are shown in 3 plotted diagrams and 2 graphs. Mixtures of liquid and gaseous fuel, burning in air enriched with oxygen gas, are found to show most promise as means of increasing engine power at altitude.

PB 19818. SHIFFMAN, MAX. The effect of non-spherical shape on the motion of a rising underwater gas bubble (preliminary memorandum) (New York Univ. Applied Math Group Memo 23; NDRC Applied Math Panel Memo 37.5 M) Sep 1943. 12 p. Price: Microfilm-50¢ - Photostat-$1.00

The problem under consideration is the motion of a pulsating gas mobile, produced by an underwater explosion, as influenced by the buoyant force due to gravitation. This problem was first considered by C. Herring, using a perturbation method. It was then taken up by G. I. Taylor, who integrated the exact equations under the assumption that the bubble remains spherical in shape. In the present work, this assumption is weakened by allowing deviations from spherical symmetry but supposing them to be small. However, in contrast to other works on non-spherical shape, it is not assumed that the velocity of rise of the bubble is small. Experiment shows some deviation from Taylor's results. It was found that the high pressure pulse produced when the bubble is contracting and near its minimum size is larger than that predicted by Taylor's theory. Qualitative indications are given that non-sphericity may be the cause of these deviations. Mathematical formulation of the problem is given.

PB 20831. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Removing the mystery from "AN" nomenclature. (NAVSHIPS 900,080). Jan 1945. 8 p. Price: Microfilm-50¢ - Photostat-$1.00

The Army-Navy standardized nomenclature for equipment is explained. The equipment is designated by "AN", followed by three letters and a number, indicating: (1) Where use; (2) general type; (3) general purpose; and (4) specific equipment for this purpose. Additional letters may be added for further identifying data. A chart giving a key to the system is included.

PB 18971. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Services to investigate shock performance of nuts, bolts and lock-washers. Final report, Jun 10, 1944 to Jan 15, 1945. Jan 1945. 54 p. Price: Microfilm-$1.00 - Photostat-$4.00

This final report by Armour Research Foundation covers the work done from the time of the original contract to Jan 15, 1945; it also reviews and analyses the reports previously submitted which are listed. The work can only be considered a preliminary study for a more comprehensive testing program of the shock strength of bolts. The conclusions are based on the data obtained and are valid only for the limited range of length and diameters of bolts tested. The objectives of the bolt testing program were as follows: Determination of (1) the characteristics of the special testing apparatus, (2) the nature of the failure of bolts due to shock; (3) the relation between the shock strength of bolts and characteristics as determined from a static tension test, determination of the relative shock strengths of different diameter bolts, (4) the relative shock strengths of both made of different materials, (5) the influence of the length of the bolt upon its shock strength, (6) the influence of the amount tightening of the bolt upon the shock strength, (7) the relative shock strength of bolts in tension and shear, and (8) the effectiveness of various lock-washers and lock-nuts under condition of shock. Procedures of the various tests are described in detail, and results shown in tables and grephs. The report includes six photographs of the various testing assemblies used.

PB 22225. U. S. WAR DEPARTMENT. Paper cutter PH-513/GF; V-mail. (Tech Manual 11-2302) Feb 1945. 14 p. Price: Microfilm-50¢ - Photostat-$1.00

This paper cutter is a manually operated cutter for separating processed rolls of V-mail documents into single letters. The manual describes the cutter and gives instructions for operation, and maintenance of the equipment. Photographs illustrate the manual.

PB 22360. U. S. WAR DEPARTMENT. Shelter S-1/FM. (Tech Manual 11-2563) Feb 1945. 39 p. Price: Microfilm-50¢ - Photostat-$3.00

Subject shelter consists of prefabricated sections designed for quick assembly. No special equipment is needed to erect the shelter. It is ventilated by the adjustable hatch opening at the roof apex, and the adjustable windows, one of which is located in every other wall panel. Inspect-proof screens and blackout shutters, removable from the wall panels, are furnished. A removable screen door is attached to the door panel. With the exception of the hatch, door and windows, the shelter is fully kapok-insulated, and is heated by a Miller utility heater model. Two 25-foot, rubber-insulated electric cables are used to extend the electric power within the shelter. Subject shelter is suitable for housing direction-finder equipment, and repair and service work shops. This manual contains sections describing the shelter, installation, assembly, operation, preventive maintenance (including lubrication, moistureproofing and fungiproofing), and repair procedures. Appendix contains list of maintenance parts. Photographs, drawings, and example of properly filled out War Department unsatisfactory equipment report W. D., A. G. O., Form No. 468, are included.

PB 22062. U. S. WAR DEPARTMENT. Shop work. (Tech Manual 11-483) Mar 11, 1942. 150 p. Price: Microfilm-$1.50 - Photostat-$10.00

This technical manual covers the use, care, and maintenance of tools. Lessons covered are: use of knife, pliers, and wire splices; measuring and gauges; metal working; soldering; wiring of radio equipment, cords, and plugs; wood working; miscellaneous tools; and rope, splices, knots and blocks. This text, illustrated with photographs, drawings and diagrams, was prepared by the Enlisted Men's Department of the Signal Corps School to provide a progressive course in the use and maintenance of such tools as a soldier may use in the Signal Corps.

PB 22695. U. S. WAR DEPARTMENT. Storage of quartermaster supplies. (Tech Manual 10-250) Mar 1946. 125 p. Price: Microfilm-$1.50 - Photostat-$9.00

This manual discusses problems peculiar to the storage and handling of quartermaster supplies. Chapters of the manual are devoted to the three supply commodity groups: Nonperishable substance, clothing and equipage, and general supplies. (See TM 10-210 for the storage of perishable substance items). Each chapter is separated into five main divisions: space

layout, receiving operations, storage, care and preservation of supplies, and shipping operations. Considerable storage information has been assembled in the appendices, including typical layouts for quartermaster storage areas, fork lift truck capacities, and tables of storage data on substance and general supplies. The suggested list of items which may be safely stored in open-storage areas should also be of use. There are discussions of proper short-lot storage in section IV, Appendix I and of the stock locator system in Appendix II. The classification numbers of various quartermaster items are not given in this manual. For information concerning them, see Federal Standard Stock Catalog and Quartermaster Supplement thereto. Many photographs, diagrams and drawings are included in this report.

PB 20559. U. S. WAR DEPARTMENT QUARTERMASTER BOARD. Report of observations of test of chamber, fumigation, methyl bromide, portable (Bureau of Standards) QMB T-1360. (Project S-84A) Mar 1944. 11 p. Price: Microfilm-50¢ - Photostat-$1.00
This report describes laboratory tests made at the U. S. National Bureau of Standards for gas leakage of three methyl bromide fumigation chambers. Quantitative air pressure tests were made of three chambers. After sealing openings, compressed air was introduced into a chamber and the rise of pressure within the chamber was measured in centimeters of the water column with a manometer. When the height of the water column of the manometer became stabilized and a constant reading was obtained, the time required for ten cubic feet of air to enter the chamber was measured by a dry gas meter attached to the compressed air line. An examination was made by running the hand along the seams of the chamber, while the pressure was sustained, to ascertain at what locations leakage might exist. The compressed air line was then closed and the rate of decline of the water column was recorded in seconds of time at 5 millimeter intervals. The readings are given in tabular form. Similar tests were made for determining standards of acceptance, and of gas tightness of chambers using methyl bromide gas. This last test was preceded by a test to determine the efficiency of the exhaust system devised to carry the gas out of the room. As a result of conclusions drawn from the tests, it was recommended that the chamber, Specification no. 90-B, designated in this report as Chamber #1, be considered satisfactory for field use with respect to gas tightness, but unsatisfactory for inside installations in this same respect.

PB 20676. U. S. WAR DEPARTMENT. QUARTERMASTER BOARD. Report of test of buttons, tack, aluminum, QMB T-286. (Project T-1361) Feb 1944. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
Procedures and findings of test to determine resistance of buttons to high laundering temperatures (up to 160°F.) are described.

PB 18405. U. S. WAR DEPARTMENT. QUARTERMASTER BOARD. Report of test of table, camp, folding (experimental). (Project T-128) Mar 1943. 5 p. Price: Microfilm-50¢ - Photostat-$1.00
The conclusions reached were: (1) The present hinge does not adequately provide for the stress as imposed on the table by normal use; (2) the web strap fastener is an adequate substitute for the leather strap fastener; (3) the experimental table is the more serviceable of the two types of table due to the metal adjustable clamp attached to the center board. Test procedure and findings are presented.

PB 18413. U. S. WAR DEPARTMENT. QUARTERMASTER BOARD. Report of test of trumpet, G with slide to F, plastic. (Project T-194) Jul 1943. 9 p. Price: Microfilm-50¢ - Photostat-$1.00
The plastic trumpet is less durable than the metal trumpet, with the greatest weakness at the joints and seams. Notes in the lower register are not as true on the plastic trumpet as on the metal trumpet, particularly low C and middle G. The plastic mouthpiece is not satisfactory in its present form. Conduct of test and findings are recommended.

PB 21849. U. S. WAR DEPARTMENT. QUARTERMASTER BOARD. Report of test of utensils, miscellaneous, kitchen (plastic) QMB T-1241. (Project T-195) Aug 1943. 8 p. Price: Microfilm-50¢ - Photostat-$1.00
Tests were made by the Quartermaster Board to determine the suitability of plastic utensils in lieu of metal utensils currently used. The materials tested were plastic grater, knives, scoops, funnels and plastic wool cleaning material. From the various tests made, it was concluded that: 1) The plastic funnel and scoop are satisfactory substitutes for comparable metal items; 2) the plastic knife is not a satisfactory substitute for a steel knife; 3) the plastic grater is impractical for mess kitchen use; 4) the plastic cleaning wool is satisfactory when used with a scouring agent, but is not as effective as steel wool used with or without a scouring agent; 5) the plastic kitchen utensils do not communicate taste or odor to food and have no apparent toxic effect; 6) these utensils become unserviceable when placed in extremely hot water; and 7) dilute solutions of caustics or fruit acids have no apparent effect on the plastic utensils.

PB 20561. U. S. WAR DEPARTMENT. QUARTERMASTER BOARD. Report of test of whistle, thunderer (plastic) with cord and hook (plastic). (Project T-159). Apr 1943. 7 p. Price: Microfilm-50¢ - Photostat-$1.00
A number of plastic thunderer whistles with plastic hooks and cords were tested in field use and by other tests to determine their suitability as substitutes for the standard issue thunderer whistle with metal cord and hook. It was concluded that the plastic whistle and cord, while less durable than the metal items of the standard issue, was satisfactory; and that the plastic hook was not adequate for normal usage.

PB 20555. U. S. WAR DEPARTMENT. QUARTERMASTER BOARD. Report of test of windshield, glass cloth, for cookset, mountain, QMB T-1444. (Project T-360). Aug 1944. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
Procedure and findings of test are described. The principle of the windshield in conjunction with the mountain cookset is recommended to be practical for field use; it was found to be practical for providing wind protection and heat concentration, and thus increasing output. The type 5 glass-asbestos cloth windshield was found superior to the other windshields used in this project. Further suggestions for improvement of windshield and its use are given.

PB 20564. U. S. WAR DEPARTMENT. QUARTERMASTER BOARD. Report of test of windshield, metal, for outfit, cooking, 1-burner - QMB T-1529. (Project T-418). Dec 1944. 7 p. Price: Microfilm-50¢ - Photostat-$1.00
This is a report of tests conducted to determine whether metal windshields improve the performance of the one-burner gasoline cooking stove, (M-1942, modified). Tests were made under various conditions of wind velocity and observations were made on the ease of assembling and adjusting the windshield, ease of operating the stove, time required to bring water to a boil, durability, safety, and other factors. It was concluded that this metal windshield is practical for providing protection against light or moderate winds, and provides effective concentration of heat; however, it is inadequate for providing protection against high winds. It was found to be sufficiently durable for field use. As an alternative, a shield improvised from a No. 10 can was found to be effective against high winds, but it cannot be carried within the cookpot.

PB 20574. U. S. WAR DEPARTMENT. QUARTERMASTER BOARD. Report on field test of shoe tap manufactured from scrap brake lining. (Project T-13). Jun 1942. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
Procedure of to determine wearing quality of this type of tap is described. It was found that taps made from scrap brake linings are entirely unsatisfactory as a repair tap for service shoes.

PB 20872. U. S. WAR DEPARTMENT. QUARTERMASTER BOARD. Supplementary report of test of chamber, fumigation, methyl bromide, portable (experimental)-QMB-S-84. (Project T-1318) Mar 1943. 17 p. Price: Microfilm-50¢ - Photostat-$2.00
Procedure and findings of tests are described. It is recommended that fumigation chamber, specification No. 90, be considered satisfactory for field use providing the front or door panel is redesigned to furnish adequate protection for the door gasket and a more adequate method of securing the door panel and effecting a satisfactory seal; and providing the original applicator is replaced and an improved applicator installed that will change the point of puncture to prevent leakage, and readjust the seat to allow utilization of all the liquid methyl bromide. It is also recommended that fumigation chamber specification No. 90-B be considered satisfactory for field use providing suitable panel gaskets are installed that will eliminate the leakage now resulting from deficient gaskets; and providing the original applicator is replaced and the improved applicator used during the test or a still more satisfactory substitute installed.

PB 20868. U. S. WAR DEPARTMENT. QUARTERMASTER BOARD. Tentative findings on trumpet, G, with slide to F, plastic (Item No. 329) QMB T-1450 - 329. (Project T-356) Jul 1944. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
Tests were made on five plastic trumpets by issuing them to five buglers at Camp Indian Bay, Florida, and asking them to use the plastic bugle exclusively, to observe tone and pitch, to report on trueness, loudness and clarity of tone; to compare the plastic with a metal instrument; and to report any breakage as soon as such failures occurred. After three days the men were interviewed individually. Summary of findings is as follows: All five men stated that the pitch was true and remained on key; four of the men considered the tone as resonant and even louder than that of a brass bugle; all men found that the slides worked satisfactorily; all five objected to the mouthpiece of the plastic bugle as it was so made that it cut the lip. Three of the five bugles failed within 13 days, two due to cracks at seam.

PB 20866 and PB 20867. U. S. WAR DEPARTMENT. QUARTERMASTER BOARD. Test of burner, down-draft, gravity feed, for field bake oven, M-1942. (Project T-190). Final report, Jul 1943, 9 p. Preliminary report, May 1943, 12 p. Price of each: Microfilm-50¢ - Photostat-$1.00
Procedures and findings of tests are described. Final report (PB 20866) recommends that the burners be considered satisfactory for use in the M-1942 field bake oven with either gasoline or Diesel oil as fuel and be considered far superior to the fire unit, M-1937, with regard to ease of operation and control, baking characteristics, dependability, simplicity of construction, amount of maintenance required, safety, and the equal of the fire unit in fuel economy. Suggestions for improving burners are listed. See PB 20870 for report of test of pot-type burner.

PB 19175. U. S. WAR DEPARTMENT. QUARTERMASTER CORPS. Combined operation and maintenance manual and parts list for bath unit, field, mobile, model 2B-24. (Tech Manual TM 10-1616) Jan 1, 1944. 94 p. Price: Microfilm - $1.00 - Photostat - $7.00
The Orr and Sembower mobile shower bath unit is intended to afford a mobile, compact, rapid and efficient means of providing shower bath facilities under field conditions wherever there is an adequate supply of water available. A continuous flow of water at the desired temperature is delivered at the rate of approximately 2 gallons per minute from each of twenty-four shower heads arranged for convenient bathing. These instructions are published for the information and guidance of the personnel to whom this equipment is assigned. Manual contains description, operating instructions, photographs, illustrations and exploded views with all parts identified, and a complete parts list.

PB 19163. U. S. WAR DEPARTMENT. QUARTERMASTER CORPS. Quartermaster handbook, bakery company. (Tech Manual 10-415) Jul 1943. 121 p. Price: Microfilm-$1.50 Photostat-$9.00
This handbook is intended to provide the personnel of the quartermaster bakery company with a source of condensed information on the organization, training, operation, and administration of the company. Its purpose is to furnish a convenient compilation of the basic information and data necessary for the efficient functioning of the company. Subjects covered are: Sanitation; preparation for field operations; new, old and improvised equipment; and formulas and baking records. Drawings, diagrams, tables and organizational charts illustrate the text. Appendices contain parts lists, shop operation guide, loading plans, glossary, training chart and detailed treatment of British mobile equipment.

PB 19161. U. S. WAR DEPARTMENT. QUARTERMASTER CORPS. Quartermaster handbook, gasoline supply company. (Tech Manual 10-465) May 1943. 99 p. Price: Microfilm-$1.00 - Photostat-$7.00
This handbook is intended to provide the personnel of the quartermaster gasoline supply company with a source of condensed information on the organization, operation, and administration of the company. Its purpose is to furnish a convenient compilation of the basic information and data necessary for the efficient functioning of the company. Subjects covered are: Field operations, gasoline distributing points, storage and handling of lubricants, security and defense measures, supply and replacement of equipment. Drawings and organizational charts, references, glossary, and miscellaneous planning data illustrate the text.

PB 19158. U. S. WAR DEPARTMENT. QUARTERMASTER CORPS. Quartermaster handbook, laundry company, semimobile. (Tech Manual 10-352) Mar 1943. 139 p. Price: Microfilm-$1.50 - Photostat-$10.00
This handbook is intended to provide the personnel of the quartermaster laundry company with a source of condensed information on the organization, operation, and administration of the company. Its purpose is to furnish a convenient compilation of the basic information and data necessary for the efficient functioning of the company. Laundry equipment is described and instructions for its maintenance are given. Drawings, a glossary and organizational charts are included.

PB 19162. U. S. WAR DEPARTMENT. QUARTERMASTER CORPS. Quartermaster handbook, railhead company. (Tech Manual 10-379) Nov 1943. 111 p. Price: Microfilm-$1.50 Photostat-$8.00
This handbook is intended to provide the personnel of the quartermaster railhead company with a source of condensed information on the organization, training, operation, and administration of the company. Its purpose is to furnish a convenient compilation of the basic information and data, necessary for the efficient functioning of the company. Subjects covered are: Site, personnel and equipment of railhead; operations; security and defense; and supply and replacement of equipment. Drawings and tables illustrate the text. A list of references and a glossary are also included.

PB 19160. U. S. WAR DEPARTMENT. QUARTERMASTER CORPS. Quartermaster handbook, refrigeration company, mobile. (Tech Manual 10-615) Nov 1943. 90 p. Price: Microfilm-$1.00 - Photostat-$6.00
This handbook is intended to provide the personnel of the quartermaster refrigeration company, mobile, with a source of condensed information on the organization, operation and administration of the company. Its purpose is to furnish a convenient compilation of the basic information and data necessary for the efficient functioning of the company. Contains drawings, and diagrams of refrigeration equipment, charts, tables of equipment, loading and storage data, references, and glossary.

PB 19169. U. S. WAR DEPARTMENT. QUARTERMASTER CORPS. Quartermaster handbook, salvage collecting company. (Tech Manual 10-286) Feb 1944. 134 p. Price: Microfilm-$1.50 - Photostat-$9.00
This handbook is intended to provide the personnel of the quartermaster salvage collecting company with a source of condensed information on the organization, training, operation, and administration of the company. Its purpose is to furnish a convenient compilation of the basic information and data necessary for the efficient functioning of the company. Contains drawings, diagrams, organizational charts, tables of equipment, glossary, and list of references.

PB 19068. U. S. WAR DEPARTMENT. QUARTERMASTER CORPS. War dogs. (Tech Manual 10-396) Jul 1943. 143 p. Price: Microfilm-$1.50 - Photostat-$10.00
This manual deals in detail with the training of dogs for military use in warfare. The text is arranged in four chapters covering the following subjects: Organization, administration, and history of military use of dogs; traits and care of military dogs; basic training; and specialized training. Appendix I, covers training programs, and appendix II contains a bibliography. Thirty two breeds are listed as suitable for military service, with general appearance and special traits noted for each dog. Photographs throughout the book illustrate training methods and care of the dogs.

PB 21145. U. S. WAR DEPARTMENT. SIGNAL CORPS. The homing pigeon. (Tech Manual 11-410) Jan 1945. 85 p. Available from Supt. Documents, Washington 25, DC. Price: 25¢
Instructions for proper breeding, care, and training of the homing pigeon, and for the selection and training of enlisted pigeoneers are provided in this manual. Included are descriptions of the homing pigeon, instructions for care, loft management and records, training of pigeons and pigeoneers, mating and breeding, and diseases and medicines. Photographs and drawings are included. Instructions in FM-24-5 for units using the homing pigeon in communication have not been repeated. The mission, function, and operation of a signal pigeon company and the tactical employment of pigeons are described in FM 11-80.

PB 19085. U. S. WAR DEPARTMENT. TRANSPORTATION CORPS. Stevedoring. (Tech Bul 55-310-1) Jan 1945. 25 p. Price: Microfilm - 50¢ - Photostat - $2.00
This bulletin is a supplement to TM 55-310, Stevedoring, May 20, 1944, and contains information to be used in connection with the cargo handling information in that training manual. Section I contains 6 illustrations and explanations of simple improvised rigs to meet emergency situations. Section 2 contains a number of illustrations and explanations of additional general stevedoring information. These include a diagram of a vessel indicating storage nomenclature for its various parts

PB 15167. U. S. WAR and NAVY DEPARTMENTS. Army-Navy contractors guide for prime and subcontractors. (War Dept Pamphlet 34-2. Navy Dept NAVEXOS P-77) May 1945. 60 p. Price: Microfilm-$1.00 - Photostat-$4.00
This guide was prepared by the Army and the Navy primarily for their contractors, but the procedures outlined will be found useful to contractors furnishing materials to the Maritime Commission, the Reconstruction Finance Corporation (including its subsidiaries) and the Treasury Procurement Division. It gives a chronological picture of the war contractor's course of action from the time his contract is terminated to the final settlement. Specimen forms and a directory of Army and Navy field officers are included.

PB 15174. U. S. WAR and NAVY DEPARTMENTS. Instructions for prime contractors under terminated fixed-price (lump sum) supply or construction contracts (reprinted from the Joint Termination Regulation, Paragraph 943.1). Aug 1945. 14 p. Price: Microfilm-50¢ - Photostat-$1.00
These instructions summarize the principal rights and obligations of fixed-price prime contractors on termination. Additional documents which the War and Navy Departments recommend for use by prime contractors in dealing with fixed-price subcontractors on termination are included.

PB 15173. U. S. WAR and NAVY DEPARTMENTS. Instructions to subcontractors holding terminated fixed-price (lump sum) supply subcontracts (reprinted from the Joint Termination Regulation, paragraph 944.3). Aug 1945. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
This pamphlet contains instructions which the War and Navy Departments recommend be sent by prime contractors to subcontractors holding fixed-price subcontracts along with their notice of termination. It summarizes the principal rights and obligations of subcontractors.

PB 18880. WHITE, MERIT P. The force produced by impact of a cylindrical body. (OSRD Rept 1285; NDRC Armor and Ordnance Rept A-157). Mar 1943. 22 p. Price: Microfilm-50¢ - Photostat-$2.00
Two kinds of behavior are possible in compression impact: 1. The material of the moving specimen is brought to rest by the agency of the stress waves propagated from the impact zone (this is always the case for low-velocity impact); 2. the behavior of the specimen resembles that of a fluid stream striking an obstacle; the material is not stopped but flows away from the impact zone parallel to the target plane. For a particular material this latter behavior will occur for impact velocities above a certain "critical velocity", whereupon a sudden decrease occurs. As the impact velocity increases beyond this value the impact force again increases continuously, and for very large velocities approaches the force produced by a fluid stream of the same density, velocity and area. A method is given for calculating the value of the maximum impact force produced by the compressive impact of a cylinder of ductile material against an unyielding surface. The material which is presented has bearing on problems of terminal ballistics, particularly in connection with the development of projectiles and in the study of high velocity projectiles. Illustrative curves are included.

PB 18879. WHITE, MERIT P. and GRIFFIS, LeVAN. Wave propagation in a uniform bar whose stress-strain curve is concave upward. (OSRD Rept 1302; NDRC Armor and Ordnance Rept A-152). Mar 1943. 17 p. Price: Microfilm-50¢ - Photostat-$2.00
The plastic wave analysis which has recently been developed for materials whose engineering stress-strain curves are concave downward is extended in the present report to materials for which the stress-strain curves are partly or entirely concave upward, but always with positive slope. In this case a steady wave form is possible, one having a very sudden rise. This is identical with the "shock waves" that occur in gases. With certain simplifying assumptions, expressions relating stress or strain, particle velocity, and velocity of wave propagation in terms of the stress-strain relation of the material are developed. Illustrative stress-strain curves are included.

PB 18807. WHITTAKER, H. Substitution of lower quality industrial diamonds: Progress report; Jun 22, 1942 to Jun 30, 1943. (War Metallurgy Committee Res Rept M-37) Nov 1943. 91 p. Price: Microfilm-$1.00 - Photostat-$7.00
The objective of this investigation made by the Crane Company, was to determine the suitability of lower quality industrial diamonds for the purpose of diamond dresser tools, since the higher qualities were expected to be in short supply. Wear tests, made under conditions simulating actual dressing operations, showed that there was very little difference in resistance to the abrasion of grinding wheels between the higher and lower quality diamonds. Tables, diagrams, photographs, a patent bibliography, and a bibliography of 160 items are included.

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